Annual Report for Period: 10/2010 - 09/2011
Submitted on: 07/22/2011
Principal Investigator: Lufkin, Mimi E.
Award ID: 0734056
Organization: NAPE Ed. Foundation
Submitted By:
Lufkin, Mimi - Principal Investigator
Title:
GSE/EXT - STEM Equity Pipeline

Project Participants

Senior Personnel

Name: Lufkin, Mimi
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Morrell, Claudia
Worked for more than 160 Hours: Yes
Contribution to Project:
Claudia Morrell is the Chief Operating Officer at the NAPE Education Foundation. Her responsibilities include representing the Foundation at various national meetings to inform others about the STEM Equity Pipeline Project; she is a State Facilitator for Georgiaand Minnesota offering technical assistance and professional development to assist them in creating a state plan for implementing gender equity in STEM training in the state. She is responsible for the NSF Micromessaging Project.

Post-doc

Graduate Student

Undergraduate Student

Technician, Programmer

Name: Eccarius, Keith
Worked for more than 160 Hours: No
Contribution to Project:
Provides email and website technical assistance to project staff and consultants.

Other Participant

Name: Walker, Freda
Worked for more than 160 Hours: Yes
Contribution to Project:
Freda Walker, as a contracted consultant, provides services to the project in three ways. As assistant to the project director she helped train the state facilitators, organize the online professional development webinars and developed the expert portfolios. She also served as the State Facilitator for Illinois providing the State Team with technical assistance and professional development on the Five Step Program Improvement Process. In addition to these activities Freda served as the Co-Facilitator of Missouri during the second year of the project.

Name: Glasser, Howard
Worked for more than 160 Hours: Yes
Contribution to Project:
Howard Glasser served as the State Facilitator for Wisconsin providing the State Team with technical assistance and professional development on the Five Step Program Improvement Process. In the second year of the project Howard also servied as the State

Facilitator for Minnesota.

Name: Chiatovich, Louise

Worked for more than 160 Hours: Yes

Contribution to Project:

Louise Chiatovich served as the State Facilitator for Missouri providing the State Team with technical assistance and professional development on the Five Step Program Improvement Process. Louise served in this capacity for the first year of the project.

Name: Bostrom, Bonnie

Worked for more than 160 Hours: Yes

Contribution to Project:

Bonnie Bostrom served as the State Facilitator for Oklahoma providing the State Team with technical assistance and professional development on the Five Step Program Improvement Process. Bonnie served in this capacity only during the first year of the project.

Name: Metz, Susan

Worked for more than 160 Hours: No

Contribution to Project:

Susan Metz conducted the first STEM Equity Pipeline webinar on March 19, 2008. Her presentation on the status of women in STEM education and careers set the stage for the purpose of the project.

Name: Berry, Tricia

Worked for more than 160 Hours: No

Contribution to Project:

Tricia Berry conducte two webinars on how to assess the effectiveness of you program and how to use the tools on the Assessing Men and Women in Engineering (AWE) website. These webinars were conducted on May 21, 2008 and June 16, 2008.

Name: Grayson, Dolores

Worked for more than 160 Hours: No

Contribution to Project:

Dolores Grayson conducted a on-site professional development workshop with members of the state teams and others attending the National Alliance for Partnerships in Equity annual Professional Development Institute in Washington, DC on April 6-10, 2008 in Arlington, VA. Her workshop was on effective instructional practices to ensure the engagement of women and girls in STEM classes.

Dr. Grayson also conducted an on-site professional development workshop at the Career and Technical Education Equity Council Conference in Oklahoma City, OK September 12, 2008. The workshop was on effective instructional techniques to engage girls in STEM. She also conducted a series of four webinars with a cohort of extension agents from Missouri, Minnesota, Illinois, Wisconsin, California and Iowa. The series was on the Generating Expections for Student Achievment (GESA) program - An Equitable Approach to Educational Excellence. The purpose of GESA is to help teachers examine the impact of biases on student achievement and retention and to discover what happens when they reduce bias in their classrooms.

Name: Klein, Steve

Worked for more than 160 Hours: Yes

Contribution to Project:

Steve Klein, (title), from MPR Associates collected Perkins data from each of the participating states to be used as baseline data for the program impact evaluation. He also assisted the State Facilitators in analysing the Perkins data submitted to the project. This data analysis was used as part of the Five Step Program Improvement Process training conducted with each of the State Teams. Dr. Klein's role in the evaluation process is to work with each state lead agency to collect data on the participation and completion of female students in STEM related Career Cluster Programs of Study at the districts and community colleges where faculty are involved in the professional development efforts conducted by the State Team.

Name: Farr, Beverly

Worked for more than 160 Hours: Yes

Contribution to Project:

Beverly Farr, (title), MPR Associates prepared process data collection instruments for State Facilitators and evaluation instruments for all project activities. She will collect and analyze the results of these instruments as part of the project process evaluation. Dr. Farr is the head project evalautor and develops quarterly progress reports and updates for project staff.

Name: Nagy, Greg

Worked for more than 160 Hours: Yes

Contribution to Project:

Greg Nagy, (title), The Ohio State University is responsible for managing the STEM Equity Pipeline website and all online professional development efforts. Greg developed the website, manages its content, regularly updates the website with information provided by project staff and tracks website metrics for the project evaluation. Greg has set up Share Point sites for the staff and for each of the State Teams to manage the sharing of documents, contact information, calendars and easy one click email access to all members of the State Team. Greg assists in the conduct of each of the webinars by setting them up with WebEx, tracking registration, answering participant technical questions, providing technical assistance during the webinar, tracking evaluation completion at the end of the webinar and summarizing the results of each webinar and submitting these to the project evaluator.

Name: Blue, Holly

Worked for more than 160 Hours: Yes

Contribution to Project:

Holly Blue has developed all graphic design elements for the STEM Equity Pipeline website and print materials. Holly works closely with project staff to provide them with online and print materials for all professional development events. She also assists in the collection and submission of website content to Greg Nagy, Technology Coordinator for the project. In the second year of the project Holly has taken on the development of marketing and information efforts through the listserv and the development of online tools for inclusion on the virtual learning community (www.stemequitypipeline.org)

Name: Ayers, Joyce

Worked for more than 160 Hours: Yes

Contribution to Project:

Joyce provides financial management and organizational management for project staff and professional development activities occurring in each of the participating states. Joyce manages the project records, participant data base and staff reporting records. Joyce provides general support to the PI and project staff to ensure the success of all implemented activities.

Name: Paine, Penny

Worked for more than 160 Hours: No

Contribution to Project:

Penny Paine worked with the Assistant Director of the project to collect, develop and format the expert portfolios for the experts participating in the project. These can all be found on the STEM Equity Pipeline website.
During the second year of the project Penny provided technical assistance and conducted an on-site training on January 15, 2009 at Mt. San Antonio Community College in California.

Name: Alfeld, Corrine

Worked for more than 160 Hours: No

Contribution to Project:

Developed portfolio for the STEM Equity Pipeline Virtual Learning Community

Name: Tuvesson, Nancy

Worked for more than 160 Hours: No

Contribution to Project:

Nancy reviews all website and media resources and develops the Pipeline Press monthly for members of the STEM Equity Pipeline Virtual Learning Community listserv.

Name: Jenkins, Courtney

Worked for more than 160 Hours: Yes

Contribution to Project:

Courtney Reed Jenkins served as the State Facilitator for Iowa providing the State Team with technical assistance and professional development on the Five Step Program Improvement Process during the second year of the project.

Name: Larkey, Rick

Worked for more than 160 Hours: Yes

Contribution to Project:

Rick Larkey served as the State Facilitator for Missouri providing the State Team with technical assistance and professional

development on the Five Step Program Improvement Process.

Name: Baine, Celeste

Worked for more than 160 Hours: No

Contribution to Project:

Celeste Baine conducted a training with school counselors in Oklahoma at the Project Lead the Way Counsleor Conference on December 10, 2008.

Name: Sadker, David

Worked for more than 160 Hours: No

Contribution to Project:

Conducted a workshop and post-conference training at the California Joint Special Populations Advisory Committee Annual Conference on December 4, 2008 in Sacramento, California with teachers, counselors and administrators from secondary and community colleges in California.

Name: Casad, Bettina

Worked for more than 160 Hours: No

Contribution to Project:

Dr. Bettina Casad, Assistant Professor of Psychology and California Polytechnic State University, Pomona, CA conducted a webinar on December 17, 2008 on 'The Interactive Effects in the Theory of Planned Behavior: Examining Attitudes, Norms, control, and Stereotype Threat to Predict Girls Math Performance and Intentions.

Name: Bullock, Jessica

Worked for more than 160 Hours: No

Contribution to Project:

Jessica Bullock, Girl Tech Coordinator, Francis Tuttle Career Technical Center, Oklahoma City, OK conducted a webinar on June 18, 2009 about their award winning mentoring program for girls in STEM career and technical education programs.

Name: Matjeka, Lisa

Worked for more than 160 Hours: No

Contribution to Project:

Lisa Matjeka, Research Coordinator, Illinois Center for Specialized Professional Support conducted a workshop on how to conduct a root cause analysis using the New Look online assessment tool at the California Joint Special Populations Advisory Committee Conference December 4, 2008 in Sacramento, CA.

Name: Curry, Jane

Worked for more than 160 Hours: No

Contribution to Project:

Jane Curry provided an evening program on the history of women in science with the members of the State Teams attending the STEM Equity Pipeline Leadership Institute in Washington, DC on April 1, 2009.

Name: Winterton, Joyce

Worked for more than 160 Hours: No

Contribution to Project:

Joyce Winterton, Assistant Director of Education at NASA was the keynote luncheon speaker for the opening session of the STEM Equity Pipeline Leadership Institute. Her presentation informed the participants of the myriad ways that NASA supports STEM educators and conducts outreach and recruitment to increase the diversity of the STEM workforce.

Name: Eliot, Lise

Worked for more than 160 Hours: No

Contribution to Project:

Dr. Eliot conducted a webinar on June 2, 2010

Name: Chan, Jill

Worked for more than 160 Hours: No

Contribution to Project:

Jill Chan conducted a webinar on March 16, 2010

Name: Chapman, Robbin

Worked for more than 160 Hours: No

Contribution to Project:

Dr. Chapman conducted two webinars on November 16, 2009 and December 14, 2009

Name: Good, Katherine

Worked for more than 160 Hours: No

Contribution to Project:

Dr. Good conducted a webinar on October 26, 2009

Name: Dempsey, Pamela

Worked for more than 160 Hours: Yes

Contribution to Project:

PJ Dempsey was employed at the NAPE Education Foundation from January 18, 2010 to May 14, 2010 as the Assistant Director. Part of her responsibilities included representing the Foundation at various national meetings to inform others about the STEM Equity Pipeline project.

Name: Reha, Lynn

Worked for more than 160 Hours: No

Contribution to Project:

Lynn Reha, Director of the Illinois Center for Specialized Professional Support, along with staff of the NAPE Education Foundation created the document Nontraditional Career Preparation: Root Causes and Strategies for use with the Five Step Program Improvement Process training.

Name: Weber, Katherine

Worked for more than 160 Hours: Yes

Contribution to Project:

Katherine Weber served as the State Facilitator for the Ohio State Team and conducted technical assistance and professional development with the team to assist them in creating their state plan for implementing gender equity in STEM training in the state.

Name: Perna, Mark

Worked for more than 160 Hours: No

Contribution to Project:

Mark Perna worked with the Missouri Career Education Coordinators by providing them with expertise in student outreach strategies which they could then use with thier pilot sites participating in the STEM Equity Pipeline.

Name: Wheeler, Susie

Worked for more than 160 Hours: Yes

Contribution to Project:

Susie Wheeler serves as the State Facilitator for the Texas State Team and conducts technical assistance and professional development with the team to assist them in creating their state plan for implementing gender equity in STEM training in the state.

Name: Butler Kahle, Jane

Worked for more than 160 Hours: Yes

Contribution to Project:

Jane Butler Kahle developed an evaluation and research plan for the NSF Micromessaging blueprint project. She reviewed the blueprint, proposed research design and strategy for program delivery and evaluated all the outcomes.

Name: Bruning, Monica

Worked for more than 160 Hours: No

Contribution to Project:

Monica Bruning conducted a webinar on January 27, 2011 entitled 'Spark Talented Minority Girls' Interest in Engineering, Female Recruits Explore Engineering ??' The FREE Project'.

Name: Byars Winston, Angela

Worked for more than 160 Hours: No

Contribution to Project:

Angela Byars Winston conducted a webinar on March 22, 2011 entitled ' Cognitive Beliefs and Cultural Variables Matter in STEM Career Development'. She also completed a curriculum unit for the Micromessaging NSF project on The Intersection of Gender and Other Factors.

Name: Smyth, Fred

Worked for more than 160 Hours: No

Contribution to Project:

Fred Smyth conducted a webinar on February 16, 2011 entitled ' Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets'.

Name: Sanders, Jo

Worked for more than 160 Hours: Yes

Contribution to Project:

Jo Sanders worked on identifying a list of current research resources for the Micromessaging project. She helped to create a blueprint for curriculum development to complete teacher professional development program on the effects of micro-messaging in instructional practice on student STEM.

Name: Ebersole, Tara

Worked for more than 160 Hours: Yes

Contribution to Project:

Tara Ebersole developed one unit of curriculum and a framework for building a teacher learning community as part of the micromessaging instructional materials for the NSF Micromessaging project.

Name: Parker, Carolyn

Worked for more than 160 Hours: Yes

Contribution to Project:

Carolyn Parker completed a curriculum unit on child development and family for the Micromessaging NSF project. She also reviewed Unit II for the Micromessaging project for usability by secondary teachers (particularly science/STEM/CTE teachers) and content appropriateness for secondary teachers. She also developed a unit for the English Language Learners.

Name: Sevo, Ruta

Worked for more than 160 Hours: Yes

Contribution to Project:

Ruta Sevo provided discussions at the STEM Equity Pipeline Leadership Institute to get feedback from NAPE Education Foundation's network of state-based leaders, consultants and participants about their experience and thoughts for the future. She prepared a report describing future plans and potential for STEM Equity Pipeline. She also participated in the NSF Micromessaging Blueprint planning for Micro-Inequity Teacher Professional Development.

Name: Evans, Allyn

Worked for more than 160 Hours: No

Contribution to Project:

Allyn Evans presented a workshop 'Creating Personal and Professional Development Programs for STEM Students: Ways to Support Girls and Women in STEM' at the Career Education Coordinator Fall meeting for the Missouri STEM team on August 25, 2010.

Name: Orwig, Barbara

Worked for more than 160 Hours: No

Contribution to Project:

Barbara Orwig will complete a unit for the curriculum for the Micromessaging NSF project on career development.

Name: Bailey, Terryl

Worked for more than 160 Hours: No

Contribution to Project:

Terryl Bailey completed an evaluation plan for the Micromessaging blueprint (NSF project).

Research Experience for Undergraduates

Organizational Partners

Women in Engineering Program Advocates Network(WEPAN)

The PI presented at the annual WEPAN conference in St. Louis, MO on June 8-10, 2008. The PI presented at the annual WEPAN conference in Austin, TX on June 17-20, 2009. Mimi Lufkin, PI and Diane Matt, ED of WEPAN have been working together to develop a process for the STEM Equity Pipeline resources to be submitted to the WEPAN Knowledge Center.

National Girls Collaborative Project

The PI serves on the NGCP Champions Board. Efforts are made to coordinate project activities in states where both projects are working. State Facilitators have encourage local programs to register on the NGCP program registration director on their website. In Illinois the NGCP Kick Off and the STEM Equity Pipeline State Team meeting were held jointly. This is a great example of these two NSF funded programs working collaboratively - NGCP in informal STEM education and the STEM Equity Pipeline in formal STEM education. Mimi Lufkin, PI; Karen Petersen, PI from the NGCP and Lynn Reha from the ICSPS presented this collaborative model at the WEPAN Conference in Austin, TX June 17-20, 2009. Karen Petersen, NGCP Director, joined the STEM Equity Pipeline National Advisory Board in 2009.

Nat. Research Center for CTE

The NRCCTE conducted a Technical Assistance Academy for five states to assist them in improving their performance on the nontraditional measure in the Perkins Accountability System. Project staff were contracted to provide technical assistance and lead state workgroups at the Academy on June 26-28, 2008 in Washington, DC. All expenses including staff consulting time was paid for by the NRCCTE contract with the Academy for Educational Development who organized the Academy. Jim Stone, Director of the NRCCTE serves on the STEM Equity Pipeline National Advisory Board.

NASDCTEC

The National Association of State Directors of Career and Technical Education's Executive Director serves on the STEM Equity Pipeline National Advisory Board. NAPE also co-sponsors a project with the National Women's Law Center, the Association for Career and Technical Education and the National Association of State Directors of Career and Technical Education. The Programs and Practices That Work project recognizes programs across the country that have been successful in increasing the participation of underrepresented gender students in nontraditional career and technical education programs. Many of the past recipients of this recognition have been STEM related CTE programs. We will be continuing to sponsor this project during the life of the grant and hope that many of the future programs recognized will come as a result of our work.

Skills USA

Mimi Lufkin, PI, serves on the Skills USA Technical Committee. Staff from Skills USA and NAPE share resources and strategies for working with local education communities in high risk schools. Tim Lawrence, Executive Director of Skills USA joined the STEM Equity Pipeline National Advisory Board in 2009. Mimi Lufkin, PI, attended the Skills USA National Championships in Kansas City, MO June 24, 2009.

Association for Career & Technical Educa

The Association for Career and Technical Education's Executive Director serves on the STEM Equity Pipeline National Advisory Board.NAPE also co-sponsors a project with the National Women's Law Center, the Association for Career and Technical Education and the National Association of State Directors of Career and Technical Education. The Programs and Practices That Work project recognizes programs across the country that have been successful in increasing the participation of underrepresented gender students in nontraditional career and technical education programs. Many of the past recipients of this recognition have been STEM related CTE programs. We will be continuing to sponsor this project during the life of the grant and hope that many of the future programs recognized will come as a result of our work. Lynn Reha, Director of the Illinois Center for Specialized Professional Support and the State Contact for the STEM Equity Pipeline project in Illinois, presented about the project at the ACTE Conference in Charolotte, NC, December 4-6, 2008.

Nat'l Assocation of Workforce Developmen

The National Association of Workforce Development Professionals' Executive Director serves on the STEM Equity Pipeline National Advisory Board.

American Association of Community Colleges

The American Association of Community Colleges' Senior Program Associate serves on the STEM Equity Pipeline National Advisory Board.

American School Counselor Association

The American School Counselor Association's Assistant Director serves on the STEM Equity Pipeline National Advisory Board. The ASCA has invited the project director to write an article for the ASCA magazine on recruiting and retaining diverse students in STEM programs. The article was published in the January/February 2009 issue.

American Federation of Teachers

The American Federation of Teachers' Associate Director serves on the STEM Equity Pipeline National Advisory Board.

Center for Advancement of Scholarship on

The Center for the Advancement of Scholarship on Engineering Education's Director serves on the STEM Equity Pipeline National Advisory Board. The project director and staff from NAPE also work collaboratively with CASEE on another extension services grant - the Engineering Equity Extension Service. In this project NAPE staff have provided expert assistance to Project Lead the Way to develop professional development programming on gender equity for their master teachers and teachers.

National Association for Multicultural E

The National Association for Multicultural Education's Executive Director serves on the STEM Equity Pipeline National Advisory Board.

Wider Opportunities for Women

The Wider Opportunities for Women's Executive Director serves on the STEM Equity Pipeline National Advisory Board.

Cisco Networking Academy Program

The Cisco Networking Academy Program's National Initiatives Manager serves on the STEM Equity Pipeline National Advisory Board. Staff from the project were invited to present at the three national Cisco Networking Academy conferences in Portland,OR, Saratoga Springs, NY and Little Rock, AR.

Women Work!

The Women Work!'s President and CEO serves on the STEM Equity Pipeline National Advisory Board. In 2008, NAPE and Women Work! held their annual conferences jointly. The allowed both organziations to leverage the capacity of each to offer a larger and more diverse conference program to participants. It was an extremely successful event. We did this again March 29 - April 1, 2009 and repeated the successful event!

Center for Women in Information Technol

The Center for Women in Information Technology's Executive Director serves on the STEM Equity Pipeline National Advisory Board.

American Association for University Wome

The American Association for University Women's President serves on the STEM Equity Pipeline National Advisory Board.

National Education Association

The National Education Association's Senior Policy Analyst serves on the STEM Equity Pipeline National Advisory Board. Mimi Lufkin, PI, participated in the NEA Women's Summit April 3, 2009 in Washington, DC.

Disabilities Unlimited

The Disabilities Unlimited's Executive Director serves on the STEM Equity Pipeline National Advisory Board.

National Women's Law Center

The National Women's Law Center's Vice President for Education and Employment serves on the STEM Equity Pipeline National Advisory Board. NAPE also co-sponsors a project with the National Women's Law Center, the Association for Career and Technical Education and the National Association of State Directors of Career and Technical Education. The Programs and Practices That Work project recognizes programs across the country that have been successful in increasing the participation of underrepresented gender students in nontraditional career and technical education programs. Many of the past recipients of this recognition have been STEM related CTE programs. We will be continuing to sponsor this project during the life of the grant and hope that many of the future programs recognized will come as a result of our work.

Society of Women Engineers

The Society of Women Engineer's Executive Director serves on the STEM Equity Pipeline National Advisory Board.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The American Association for the Advancement of Science's Director, Project on Science, Technology and Disability and ENTRY POINT! serves on the STEM Equity Pipeline National Advisory Board.

Project Lead The Way

The Project Lead The Way's Vice President serves on the STEM Equity Pipeline National Advisory Board. The project director and staff from NAPE also work collaboratively with Project Lead the Way on another extension services grant - the Engineering Equity Extension Service - that has been awarded to the National Academy for Engineering. In this project NAPE staff have provided expert assistance to Project Lead the Way to develop professional development programming on gender equity for their master teachers and teachers.

Intel Corporation

The Intel Corporation's Education Manager, California Corporate Affairs serves on the STEM Equity Pipeline National Advisory Board. Intel has offered the project the use of the Live Meeting software for staff meetings/trainings and project online professional development events - all for free!

Rolls-Royce Corporation

The Rolls-Royce Corporation's Manager of Employee Development serves on the STEM Equity Pipeline National Advisory Board.

CA Commission on the Status of Women

The California Commission on the Status of Women's Executive Director serves on the STEM Equity Pipeline National Advisory Board.

Southern Regional Education Board

Gene Bottoms, Director of the Southern Regional Education Board, joined the STEM Equity Pipeline National Advisory Board in 2009. He attended the STEM Equity Pipeline Leadership Institute on Wednesday, April 1 in Washington, DC. Mimi Lufkin, PI, presented at the SREB National Conference in Atlanta, GA on July 9, 2009.

California Joint Special Populations Adv

The California Joint Special Populations Advisory Committee is the sponsoring organization for the California STEM Equity Pipeline State Team. They have provided both financial and staff support to ensure the sucess of the the professional development the project has offered in California. The JSPAC is a collaborative group sponsored by the California Department of Education and the California Community College Chancellors Office.

Illinos Center for Specialized Professio

The Illinois Center for Specialized Professional Support (ICSPS) is the sponsoring organization for the STEM Equity Pipeline in Illinois. ICSPS is funded by the Illinois State Board of Education and the Illinois Community College System. ICSPS has provided financial support to the NEW Look projects to implement a modified version of the Five Step Program Improvement Process. The Center staff has been instrumental in organizing state team activities and have participated in training as extension agents. Staff from the Center have also been involved in conducting outreach workshops at national meetings with the PI.

Missouri Center for Career Education

The Missouri Center for Career Education has served as the sponsoring organization for the STEM Equity Pipeline project in Missouri. The MCCE is funded by the Missouri Department of Elementary and Secondary Education. The eight regional coordinators from the MCCE participated in extension agent training and have been implementing the Five Step Program Improvement Process with pilot sites across Missouri.

Oklahoma Department of Career Technical

The Oklahoma Department of Career Technical Education is the sponsor of the STEM Equity Pipeline project in Oklahoma. Staff from ODCTE have been participating on the states leadership team and have been instrumental in the implementation of the professional development efforts in OK. Contributions have included staff time, facilities for training, financial support for participants, access to equipment and technology to implement training.

Wisconsin Department of Public Instruction

The Wisconsin Department of Public Instruction in collaboration with the Wisconsin Technical College System have been the sponsoring organizations for the STEM Equity Pipeline Project in Wisconsin. Staff from WDPI and WTCS have provided leadership for the project. Both organizations have provided financial support, facilities and equipment to support the professional development efforts of the project.

Wisconsin Technical College System

The Wisconsin Department of Public Instruction in collaboration with the Wisconsin Technical College System have been the sponsoring organizations for the STEM Equity Pipeline Project in Wisconsin. Staff from WDPI and WTCS have provided leadership for the project. Both organizations have provided financial support, facilities and equipment to support the professional development efforts of the project.

Minnesota State Colleges and Universitie

The Minnesota State Colleges and Universities in collaboration with the Minnesota Department of Education have been the sponsoring organizations for the STEM Equity Pipeline Project in Minnesota. Staff from MNSCU and MNDE have provided leadership for the project. Both organizations have provided staff time, financial support, facilities and equipment to support the professional development efforts of the project. MNSCU has a STEM staff person who has taken on leadership for this project as part of her job responsibilities at no expense to the project.

Minnesota Department of Education

The Minnesota State Colleges and Universities in collaboration with the Minnesota Department of Education have been the sponsoring organizations for the STEM Equity Pipeline Project in Minnesota. Staff from MNSCU and MNDE have provided leadership for the project. Both organizations have provided staff time, financial support, facilities and equipment to support the professional development efforts of the project.

Iowa Department of Education

The Iowa Department of Education has been the sponsoring organization for the STEM Equity Pipeline Project in Iowa. Staff from IA DOE have provided leadership for the project, financial support, facilities and equipment to support the professional development efforts of the project.

New Hampshire Department of Education

The New Hampshire Department of Education has been the sponsoring organizations for the STEM Equity Pipeline Project in New Hampshire. Staff from NHDOE have provided leadership for the project, facilities and equipment to support the professional development efforts of the project.

Ohio Association of Community Colleges

The Ohio Association of Community Colleges has been the sponsoring organizations for the STEM Equity Pipeline Project in Ohio. A staff person, Ben Williams, from Columbus State Community College has provided leadership for the project. Members of the Ohio State Team have provided staff time, facilities and equipment to support the professional development efforts of the project.

Aerospace Industries Association

Aerospace Industries Association's Workforce Director serves on the STEM Equity Pipeline National Advisory Board.

Georgia Technical College System

Georgia Technical College System has served as the sponsoring organization for the STEM Equity Pipeline Project in Georgia. Staff from Georgia Technical College System have provided leadership for the project. They have provided staff time, financial support, facilities and equipment to support the professional development efforts of the project.

Texas Higher Education Coordinating Board

Texas Higher Education Coordinating Board in collaboration with Amarillo College have been the sponsoring organizations for the STEM Equity Pipeline Project in Texas. Amarillo College has provided leadership staff time, financial support, facilities and equipment to support the professional development efforts of the project.

Other Collaborators or Contacts

National Defense Industry Association, Aerospace Industry Association, U.S. Chamber of Commerce, Institute for a Competitive Workforce, Kennan Institute for Eng, Tech & Sci, Quality Float Works, Career Communications Inc., U.S. Department of Education - Office of Vocational and Adult Education, Academy for Educational Development

California:

Aerojet , American Public Works Association, American River College
Bakersfield Adult School, Bakersfield College, Butte Glenn Community College, CA Commission on the Status of Women, CA Community Colleges, CA Department of Education, CA Space Education & Workforce Institute, CA Workforce Investment Board, California Association of School Counselors, California Comm. College Chancellors Office, California Conversation Corps, Career Tech Ed, Center of Excellence, Chabot Space & Science Center, Citrus College, City College of San Francisco, College of the Canyons, College of the Redwoods, Columbia College, Cordova High School, Diablo Valley College, East Side Union High School District, El Camino College, Encourage Tomorrow, Foothill Associates, GenCorp Foundation, Glendale Community College, GrayMill Consulting, Grossmont College, Grossmont Cuyamaca CCD, Intel Corporation, California Public Affairs, Kitty Hawk School ? FCUSD, LACOE-ROP, Laney College, Lassen Community College, Learning in Communities, Lompoc High School, Long Beach City College, Los Angeles County ROP, Los Medanos College, Mattole Valley Charter School, Merced College, MESA, Mira Costa Community College, Modesto Junior College, Montebello Adult School, Moorpark College, MPR Associates, Mt. San Antonio College, National Academy Foundation, Ohlone College,
Oxnard College, Paradise High School, Pathfinder Consulting Solutions, Perkins Akinada Consulting and Mission College, Poway Adult School & ROP-PUSD, Project Lead The Way, Rio Hondo College, Riverside Community College, ROP, Riverside County Office of Education, Sacramento City College, Sacramento City Unified School District, Sacramento Employment & Training Agency, San Diego County Office of Education, San Joaquin Delta College, Santa Ana College, School of Continuing Ed, Santa Barbara City College, Santa Rosa Junior College, Scott Valley Unified School District, SCUSD Engineering and Sciences, Sierra College, Silicon Valley Education Foundation, Siskiyou County Office of Education, Solano Community College, South Central Regional Consortium/Ventura College, Southwestern College,
Sustainable Programs for Independent Neighborhoods, University of California, Davis, Victor Valley Union High School Dist., Wallner Consulting, Wm. S. Hart UHSD, Yuba County Office of Education,Yucaipa-Calimesa Joint Unified School District

Georgia:

Atlanta Technical College, Atlanta Public Schools, Chattahoochee Technical College, Clayton County Public Schools, College of Coastal Georgia, Coosa Valley Technical College, Dalton State College, Fulton County Schools, Moultrie Technical College, Savannah Technical College, Middle Georgia Technical College, Altamaha Technical College, Augusta Tech, Gwinnett Technical College, Heart of Georgia Tech, Technical College System of Georgia, Monroe Area High School, North Georgia Tech, Ogeechee Technical College, Southeastern Tech, Columbus Technical College, DeKalb Tech, Albany Technical College, Central Georgia Technical College, Lanier College, Bainbridge College, Sandersville Tech, Flint River Technical College, Athens Technical College, Anderson 1 & 2 Career/Tech Center, The STEMS@Therrell, South Georgia Tech, Richmond County School System, Wiregrass Georgia Technical College and Georgia Department of Education.

Illinois:

Chicago Pubic Schools, College of DuPage-Cisco Networking Academy, Heartland Community College, ICCB, Illinois State Board of Education, Illinois Center for Specialized Professional Support ,Illinois Community College Board, Illinois Math and Science Academy, Illinois Office of Educational Services, University of Illinois, Verizon, Chicago Workforce Board, Illinois Math and Science Partnership, Joliet Junior College, Bement High School, College of DuPage, Danville Area Community College, Lincoln Land Community College, Sauk Valley Community College, Wilbur Wright Community College, Elgin Community College, Olney Central College Learning Center, John Wood Community College, Kaskaskia College, Kishwaukee College and Southwestern Illinois College

Iowa:

Albia Community High School, Clarksville Community Schools, Des Moines Area Community College, Girls Scouts of Greater Iowa, Hawkeye Community College, Indian Hills Community College, Iowa Commission on the Status of Women, Iowa Department of Education, Iowa Dept. of Economic Development, Iowa State University, Iowa Western Community College, Iowa Workforce Development, Prairie Lakes Area Education Agency, Rockwell Collins, Shenandoah High School, Technology Association of Iowa, Tri-Center High School, UNI/IMSEP, Western Iowa Tech Community College, Grant Wood AEA, Kirkwood Community College, Women in Science and Engineering, Iowa Mathematics and Science Education Partnership, Denver School District, Williamsburg High School, Iowa City West High School, Cedar

Rapids School District and Mount Vernon High School.

Minnesota:

Minnesota Department of Education, Minnesota State College and Universities, Anoka-Ramsey Community College, Lakes Country Service Cooperative, Minneapolis Public Schools, Minnesota State University, Minnesota High Tech Association, Pathways to Employment/DEED VR, Science Museum of Minnesota, SE Service Cooperative, Society for Women Engineers, South Central College, STEP Academy, Winona State University, Metropolitan State University, St. Paul Public Schools, St. Paul College, Ridgewater College, Gibbon-Fairfax-Winthrop Schools, Wayzata High School, Hopkins High School, North Hennepin Community College, Eden Prairie High School, Normandale Community College, Bloomington Schools, Kennedy High School, Jefferson High School and Shakopee High School.

Missouri:

Carrollton Area Career Center School, Cass Career Center, Cisco Systems, Columbia Career Center, Current River Career Center, Dept. of Elementary & Secondary Education, Fort Osage School District, Fort Zumwalt, Hickman Hills, Hillyard Technical Center, Kennett Career Center, Kirksville Area Technical Center, Linn State Technical College, MAHEC, Mineral Area College, Missouri Center for Career Education, Missouri Dept. of Elementary and Secondary Education, Missouri University of Science and Technology, Moberly Area Community College, Nichols, Northland Career Center, Ozarks Technical Community College, Ray-Pec High School, Ritenour High School, Rolla Technical Institute, Sikeston R-6 Schools, Smith Hale Middle School, Southeast Missouri State University, Southwest Area Career Center, St. Louis Community College, University of Central Missouri, Washington University, William Chrisma Senior High School, Winfield High School, Woodland R-IV Middle School, Excelsior Springs Career Center, Brookfield Career Center, Columbia Career Center, Crowder College, Alliance for the Status of Missouri Women, Department of Economic Development, KCMO School District, Poplar Bluff R-I, and South Central Career Center.

New Hampshire:
Community College System of NH, GLOBE, Great Bay Community College, Information Technology & Manufacturing Partnership, Keene State College, Manchester School of Technology, Milford High School & Applied Technology Center, New Hampshire Department of Education, New Hampshire Project Learning Tree, New Hampshire Technical College, Pinkerton Academy, Profile School, Project HOME, Project WET, Project WILD, Sugar River Valley Regional Technical Center, The SABEN's Group, U S Forest Service, University of New Hampshire, and White Mountains Community College

Ohio:

Battelle/Ohio STEM Steward, Butler Technology and Career Development Schools, Cincinnati State Technical and Community College, Columbus State Community College, Eastern Gateway Community College, Ohio Association of Community Colleges, Ohio Board of Regents, Ohio Department of Education, Ohio Mathematics & Science Coalition, Ohio Resource Center (Mathematics, Science and Reading), Owens Community College, Sinclair Community College, Stark State College of Technology, University Hospitals, and Washington State Community College

Oklahoma:

Caddo Kiowa Technology Center, Canadian Valley Technology Center, Carl Albert State College, Catoosa Public Schools, Central Technology Center, CKTC, Francis Tuttle, Gordon Cooper Technology Center, Great Plains Technology Center, Indian Capital Technology Center, Kiamichi Technology Center, Konawa High School, Meridian Tech, Metro Technology Centers,,
Mid-America Technology Center, Moore Norman Technical College, Moore Norman Technology Center, Northeast Technology Center, OKCPS, Oklahoma Department of Career & Technology Education, Southern TC, Stillwater Public Schools, Tahlequah High School, TriCounty, Tulsa Public Schools, Tulsa Technology Center, Western Technology Center, Yukon Public Schools, Choctaw High School, Claremore High School, East Central University, Keys High School, Langston University, Pioneer Tech Center, Red River Tech Center, and Rose State College

Texas:

Alamo Community College, Alvin College, Amarillo College, Angelina College, Austin Community College, Blinn College, Brazosport College, Brookhaven College, Central Texas College, Cisco Junior College, Clarendon College, Coastal Bend College, College of the Mainland, Collin County Community College District, Dallas County Community College District, Del Mar College, Frank Phillips College, Galveston College, Grayson County College, Hill College, Houston Community College, Howard County JC District, Kilgore College, Lamar

Institute of Technology, Lamar State College, Laredo Community College, Lee College, Lone Star College, Lone Star College System District, McLennan Community College, Midland College, Navarro College, North Central Texas College, Northeast Texas Community College, Odessa College, Paris Junior College, Ranger College, Richland College, San Jacinto College District, South Texas College, Southwest Texas Junior College, Temple College, Temple Junior College, Texarkana College, Texas State Technical College ? Marshall, Texas State Technical College Harlingen, Texas State Technical College WACO, Texas State Technical College West Texas, Trinity Valley Community College, Tyler Junior Collegem, University of Texas at Brownsville, Vernon College, Weatherford College, Western Texas College, and Wharton County Junior College.

Wisconsin:

Alverno College, Badger Science and Engineering Fair, Blackhawk Technical College, Bowman Performance Consulting, Center of Education and Work/Univ. of Wisconsin, CESA #3, CESA 1, CESA 11, CESA 5, CESA 9, Chippewa Valley Technical College, Department of Workforce Development, Educational Communications Board, Elkhorn Area High School, Elmbrook School District, Engineer & Scientists of Milwaukee, Farnsworth Middle School, Fox Valley Technical College, Gateway Technical College, Horace Mann Middle School, Inacom Information Systems, Kettle Moraine School District, Lakeshore Technical College, Lincoln High School, Madison Area Technical College, Manitowoc Public Schools, Medical Physics Department, Mid-State Technical College, Milwaukee Public Schools, Milwaukee School of Engineering, Monona Grove School District, Moraine Park Technical College, MPTC, North Crawford Schools, Northcentral Technical College, Northeast Wisconsin Technical College, Oconto Falls Public School, P&H Mining Equipment, Plymouth High School, Riverview Middle School, Sheboygan Area School District, Sheboygan North High School, Sheboygan South High School, Technical College System: Engineering & Manufactur, University of Wisconsin ? Madison, University of Wisconsin Eau Claire, Waukesha County Technical College, Waunakee Community Schools, Wilmot Union High School, Winter School District, Wisconsin Department of Public Instruction, Wisconsin Technical College System, Wisconsin Technical College System Board, Wisconsin Technical System Office, Badger High School, CESA 10, CESA 12, CESA 4, CESA 6, CESA 7, CESA 8, Clarke Street School, and Menomonie Area Public Schools.

Activities and Findings

Research and Education Activities: (See PDF version submitted by PI at the end of the report)

STEM Equity Pipeline
Year Four Annual Report? July 1, 2010 ? June 30, 2011
Activities

The STEM Equity Pipeline is now in its fourth year of implementation. The project continues to focus on its stated goals in the original proposal:
1. Build the capacity of the formal education community to implement research-based approaches proven to increase the participation and completion of females, including those with disabilities, in science, technology, engineering and math (STEM) education.
2. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
3. Broaden the commitment to gender equity in STEM education

In addition, the project has not wavered from its original implementation design and continues to work with teams of staff development professionals in states to act as extension agents within their particular professional development delivery systems. In many of the states due to the local control of professional development this work has been with teams located at community colleges, high schools and middle schools. Cross institutional teams continue to been trained in the Five Step Program Improvement Process, a data driven decision making process that assists teams in identifying effective implementation strategies to increase the participation and completion of females in STEM related programs of study.

NATIONAL ADVISORY BOARD

A National Advisory Board (NAB), currently consisting of twenty- eight members was formed in the first year. The NAB includes representatives from the following organizations participating: Aerospace Industry Association, American Association of University Women, Association for Career Technical Education, American School Counselors Association, American Association for the Advancement of Science,

American Association of Community Colleges, American Federation of Teachers, California Commission on the Status of Women, Cisco Networking Academy Program., Connecticut State Department of Education, Center for the Advancement of Scholarship on Engineering, , Disabilities Unlimited Consulting Services, EdLab Group, Intel Corporation, , Inc, National Association of State Directors of Career and Technical Education, National Association of Workforce Development Professionals, National Education Association, National Research Center for Career & Tech. Education, National Women's Law Center, Project Lead the Way, Rolls-Royce Corporation, SkillsUSA, Society of Women Engineers, Southern Regional Education Board, Women in Engineering ProActive Network, Wider Opportunities for Women, Association for Gender Equity Leadership in Education. Contact information for the NAB can be found at www.stemequitypipeline.org. The NAB held one meeting in 2010-11 during the NAPE Professional Development Institute on Thursday, April 14, 2011. The NAB meeting consisted of lunch with representatives of the state teams participating in the STEM Equity Pipeline project, a review of the projects current activities, evaluation results and plans for the next year and beyond. (see minutes in the attachments section)

EXTENSION SERVICES GROUP

In 2010-11 twelve experts (Lise Eliot, Ph.D, Monica Bruning, Paul Gorski, Angela Byars-Winston, Fred Smyth, Mimi Lufkin, Claudia Morrell, Courtney Reed-Jenkins, Howard Glasser, Katherine Weber, Winifred Walker, and Susie Wheeler were used to conduct webinars, present workshops at the professional development institute, or present at participating state professional development events. These individuals are named in the Participants: 'Who has worked on this project?' section of this annual report. States have relied on their State Facilitator or the PI to conduct professional development and using experts to supplement when content specific training is requested.

The project staff met in Philadelphia, Pennsylvania, July 9-12, 2010. The staff meeting agenda is included in the attachments to this report. State Facilitators are their assigned states are: Mimi Lufkin, California, Missouri, Oklahoma, and New Hampshire; Freda Walker, Illinois and Missouri; Howard Glasser, Wisconsin and Minnesota; Courtney Reed Jenkins, Iowa; Randy Dean, Georgia and Susie Wheeler, Texas. In addition to the state facilitators the project evaluator Sandra Staklis from MPR, Inc. attended. The three days were spent reviewing the first, second and third year states progress, increasing skills in presenting the Five Step Program Improvement Process, evaluating the third year's activities and reviewing the evaluation plan for the pilot sites.

All members of the project staff met at the NAPE Professional Development Institute and STEM Equity Pipeline Leadership Institute in Washington, DC April 11-14, 2011. Each State Facilitator met with their state teams and participated in professional development training.

The management team consisting of the PI, the five state facilitators, two support staff located in the national office, the VLC manager and the two project evaluators met approximately once a month via conference call. These virtual meetings were very valuable in identifying areas of needed support, troubleshooting, and communication. The management team meetings were held on August 17, 2010, September 10, 2010, October 4, 2010, November 15, 2010, December 21, 2010, January 25, 2011, February 18, 2011, March 22, 2011, and June 2, 2011. The PI also conducted individual assistance calls with each of the state facilitators on an as needed basis. The PI also attended state team meetings and assisted the state facilitator in conducting training.

STATE TEAM DEVELOPMENT

The national office continues to create resources used by State Facilitators when training State Teams and by Extension Agents when conducting professional development with their constituents. These resources may be available for the entire project or in some cases may be developed for a specific state or even for a specific pilot site. Those resources that are for all project participants are available at www.stemequitypipeline.org. Pilot site specific materials that have been developed have been primarily survey instruments for conducting root cause research.

In addition to state based or pilot site resources the national office continues to maintain the Virtual Learning Community (www.stemequitypipeline) where online resources and training tools are constantly updated. Each state has access to Microsoft Share Point to create a virtual online workspace for their team and can also access Microsoft Live Meeting to conduct online meetings.

STATE TEAM ACTIVITES

The focus of the STEM Equity Pipeline is to build the gender equity in STEM knowledge of individuals who conduct professional development with STEM educators. During year four, eleven states participated in the project: California, Georgia, Illinois, Iowa, Minnesota, Missouri, New Hampshire, Ohio, Oklahoma, Texas and Wisconsin.

TWO NEW STATES SELECTED FOR 2010-2011

States in year one of implementation typically form their State Team, identify the potential STEM professional development mechanisms in the state, conduct a performance gap of girls in STEM related programs of study in the state and settle on an implementation strategy. Because of lessons learned in the previous three years and that there will only be two years of implementation for these two new states the management team decided to test a slightly different implementation mechanism that we hoped would fast track their start-up. The two new states (Georgia and Texas) were selected to participate by the management team because of their previous history of NAPE conducting training in their state. In both states, staff from all of the community colleges had participated in a modified version of the Five Step Program Improvement Process training. The management team felt that the interest and demonstrated commitment of the community college systems in both states to equity in their career and technical education programs were primary indicators of potential successful implementation in these states. The implementation process was also slightly modified in these states:
? No formal large state team was organized ? an informal group of state level staff involved with the project has been functioning as the state leadership team
? Pilot sites were selected through a formal application process in both states, led by community colleges with required secondary partners
? Pilot site teams were formed to lead the process at their schools.
? Pilot site teams were trained in the Five Step Program Improvement Process and have been provided with monthly technical assistance and to monitor their progress.
? Pilot site team members and state level staff have functioned as extension agents in their state by sharing project results with their peers and presenting at local and state level professional development activities.

QUARTERLY STATE LEADERSHIP MEETINGS

In 2010-11, the STEM Equity Pipeline project implemented a new strategy to facilitate cross state collaboration and sharing. Quarterly conference calls/webinars were held with representatives of each of the state leadership teams. These calls were held on July 20, 2010, October 19, 2010, and January 18, 2011 for approximately one and one half hours each. The feedback from these calls has been very positive and many good ideas have been shared. These calls have also provided a mechanism for new states to learn from those states that have been involved in the project longer.

STATES IN YEAR ONE OF IMPLEMENTATION

GEORGIA
The STEM Equity Pipeline project in Georgia is led by a team of state staff from the Georgia Technical College System. In the summer of 2010, the team developed a pilot site application process and selected four pilot sites: Atlanta Technical College, Middle Georgia Technical College, Augusta Technical College, and Heart of Georgia Technical College. As part of the application process each site selected at least one STEM related program of study that had low female participation rates as their target program. Each pilot site created an implementation team consisting of an administrator, counselor and faculty from the target program and staff from their chosen secondary school partners who are feeder schools for the college.

In September of 2011 Claudia Morrell joined the staff at the NAPE Education Foundation and was assigned as the State Facilitator for Georgia. In this capacity, Claudia conducted training and technical assistance meetings with the pilot sites and worked with the state staff at the Georgia Technical College System to implement the project in Georgia.

The four pilot sites met on November 16, 2010 and participated in training on Steps 1 and 2 of the Five Step Program Improvement Process. Each team conducted a performance gap analysis of their selected program(s) and created an action plan for conducting their root cause research. Representatives from each of the pilot sites participated in monthly technical assistance meetings conducted online or as conference calls. These were held on December 15, 2011, January 19, 2011, February 16, 2011, March 16, 2011, April 20, 2011 and June 28, 2011. On May 10, 2011 the pilot sites met at Heart of Georgia Technical College for an all day onsite technical assistance meeting. The State Facilitator worked with the pilot site teams on their specific needs, including reviewing the five step program improvement process, learning about marketing and surveys, and designing recruitment materials for the state

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 10 participants from Georgia attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? June 30, 2011. Georgia had 13 people participate in these webinars.

TEXAS

The STEM Equity Pipeline project in Texas is led by Amarillo College under a grant from the Texas Higher Education Coordinating Board.

This collaboration represents a different model for conducting this project in a state where either state staff is unavailable or spread too thin to take on this task and resources are available through Perkins Act grant funds to support the projects mission. The THECB awarded a grant to Amarillo College to conduct outreach and professional development with community colleges in Texas including disseminating the results of the work of the STEM Equity Pipeline. Susie Wheeler, the individual who is implementing this work under the THECB grant at Amarillo College, is also serving as the State Facilitator for the STEM Equity Pipeline project. This collaboration has helped both of us leverage our resources. Staff from Amarillo College and representatives from each of the selected pilot sites are serving as the Leadership Team.

In the summer of 2010, the Texas project developed a pilot site application process and selected four pilot sites: Amarillo College, Clarendon College, Alvin Community College, and Texas State Technical College. As part of the application process each site selected at least one STEM related program of study that had low female participation rates as their target program. Each pilot site created an implementation team consisting of an administrator, counselor and faculty from the target program and staff from their chosen secondary school partners who are feeder schools for the college.

Representatives from four pilot sites met at the Texas Association for Career and Technical Education conference in Austin, Texas on October 4-5, 2010. All of the pilot sites had participated in the Five Step Program Improvement Process training the year before so this training session was a review of the process and included a focus on Steps 4 (Evaluation) and 5 (Implementation). Each of the teams started on their implementation plans and set deadlines for each of the phases of the process. Representatives from each of the pilot sites participated in technical assistance conference calls on November 10, 2010 and January 6, 2011. In addition the State Facilitator conducted an onsite visit to Texas State Technical College in Waco, TX to work with the college's gender equity team.

In addition to pilot site support much effort was made this year to conduct outreach across the state about the projects resources. The following outreach activities were conducted by the State Facilitator
September 25, 2010 ? Attended the STEM conference at West Texas A&M University and networked with math and science faculty and other statewide STEM organizations.
November 17, 2010 ? Presented at the Texas Higher Education Coordinating Board meeting to inform them of the STEM Equity Pipeline project.
January 21, 2011 ? Presented at the Texas STEM Center Coalition Conference in Austin.
April 7, 2011 ? Presented at the Texas Association for Career and Technical Education conference with representatives from two of the pilot sites.
April 15, 2011 ? Presented at the Texas Higher Education Coordinating Board meeting to inform them of the progress of the pilot sites and the resources available to all schools in Texas.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 4 participants from Texas attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Texas had 32 people participate in these webinars.
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STATES IN YEAR TWO OF IMPLEMENTATION

NEW HAMPSHIRE

New Hampshire's implementation strategy is being led by the New Hampshire Department of Education. In June of 2010, Bob McLaughlin from the NHDOE took over as the state contact for the project in New Hampshire. Unfortunately Bob had a personal tragedy that has not allowed him to continue in this role. Currently, Michelle Munson from NH EPSCoR at the University of New Hampshire, and a member of the state team, has agreed to take over this role. The state team that was formed at the beginning of the project did not meet formally this year although many of the members are participating on the Leadership Team and attended the training conducted during the year. The implementation focus this year has been on the two pilot sites and working with staff from the NH Community College System. The pilot sites include: Milford High School & Applied Technology Center and Sugar River Valley Regional Technical Center. A cadre of independent professional development providers was identified and were trained on infusing equity into STEM related programs so they would include it in the professional development they provide and/or train their organization's professional development providers to do so, once again 'extending' the work. The STEM Equity Pipeline continues to collaborate with the Online Professional Education Network of New Hampshire (OPEN NH) who provides online professional development to teachers in NH. Two online courses are still being developed.

The Leadership Team met on July 7, 2010, August 17, 2010, October 11, 2010, December 14, 2010 and January 21, 2011

The pilot sites received training on Steps 1 and 2 of the Five Step Program Improvement Process on September 21, 2010 at Granite State

College in Concord, NH. Teams from Milford High School and Sugar River Valley Regional Technical Center and faculty from 2 New Hampshire Community Colleges attended the training. On September 22, 2010, 16 professional development providers attended a special training on strategies for integrating gender equity into STEM teacher professional development. Follow-up training with the pilot sites on Steps 3, 4 and 5 of the Five Step Program Improvement Process was conducted on February 23, 2011 at the Plymouth Graduate Center in Concord, NH. 13 attended representing pilot site teams from Milford High School and Sugar River Valley Regional Technical Center as well as other members of the State Team and community attended.

The Leadership Team and staff from the pilot sites participated in technical assistance conference calls on August 25, 2010, December 15, 2010, January 10, 2011 and June 2, 2011.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 7 participants from New Hampshire attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports). A highlight of the Leadership Institute was an impassioned speech by Sarah Frazier, a STEM student at Sugar River Valley Regional Technical Center and a member of their pilot site team. Shortly following the Institute there was an article about her attendance at the conference and presentation in the Valley News.

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. New Hampshire had 1 person participate in these webinars.

OHIO

The Ohio STEM Equity Pipeline project is being led by the Ohio Association of Community Colleges represented by Ben Williams at Columbus State Community College. Following the State Team plans that were created in year one, year two was focused on providing support to the three pilot sites selected to participate: Cincinnati State Technical and Community College, Sinclair Community College and Washington State Community College and conducting outreach across the state about the resources available through the project.

The State Leadership Team, including representatives from the three pilot sites participated in technical assistance calls on July 7, 2010, August 11, 2010, September 15, 2010, and April 1, 2011. The State Team held a face to face meeting on June 20, 2011 with 20 attending. The outcome of this meeting was continued support for the three pilot sites and commitments to conduct outreach across the state regarding the projects work. Kathy Shibley, Career Technical Education Director for the Ohio Department of Education, participated in the meeting and spoke about the Department's commitment to gender equity in CTE and STEM. The Ohio Department of Education will be awarding Columbus State Community College a Perkins grant to support the State Contacts time to develop four additional pilot sites in 2011-12 and four more in 2012-13. This is a significant investment and evidence of sustainability of the project in Ohio.

The pilot site team from Washington State Community College participated in Five Step Program Improvement Process training at their campus on October 15, 2010 and May 6, 2011. Pilot site teams from Cincinnati State Technical and Community College and Sinclair Community College participated in the Five Step Program Improvement Process training on October 25, 2010 and April 8, 2011.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 8 participants from Ohio attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports).

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Ohio had 13 people participate in these webinars.

STATES IN YEAR THREE OF IMPLEMENTATION

IOWA

The Iowa Department of Education continues to serve as the agency that has taken on the leadership for the STEM Equity Pipeline project. Jeanette Thomas, the Iowa Equity Coordinator for career and technical education also continues to serve as the State Contact. The strategy for year three of implementation in Iowa included three items: 1) continue to support the four regional consortia pilot sites as needed; 2) identify additional opportunities to conduct outreach and training; 3) train all fifteen Iowa Community Colleges in the Five Step Program Improvement Process as part of the special Perkins grants that the Iowa Department of Education was offering to assist these colleges increase the participation and completion of women in STEM related programs of study. As a result of these three strategies the following activities occurred in Iowa in year three:

Training with 10 of the 15 Iowa Community Colleges was conducted on July 6, 2010 and August 5, 2010 as part of their preparation for the Iowa Department of Education's Perkins Grants of $9000/college to increase the participation and completion of students in nontraditional CTE

programs including women in STEM related programs of study. With the completion of this training 14 of the 15 community colleges in Iowa had participated in the Five Step Program Improvement Process training. In addition, Eastern Iowa Community College contracted with the NAPE Education Foundation to provide additional training and support beyond the scope of this project. The $135,000 investment by the Iowa Department of Education and the potential for contracting with local community colleges to continue providing support for their work is evidence of sustainability of the project in Iowa.

The Leadership Team held technical assistance calls with the State Facilitator on July 8, 2011, January 28, 2011, April 6, 2011 and May 16, 2011.

On March 2, 2011, the STEM Equity Pipeline Project supported a keynote presentation for sixteen Project Lead the Way faculty during a Program of Study meeting of the Kirkwood Community College Region. Professor Monica Bruning presented on her work to recruit African American girls into engineering and, generally, on recruitment strategies for women in STEM.

On April 22, 2011, Courtney Reed Jenkins, State Facilitator for Iowa, presented at the Diversity in STEM Conference in Des Moines, IA. A first for Iowa, this conference was sponsored by the Iowa Department of Education in partnership with the Community Colleges of Iowa and Iowa Regent Universities. The goal of the conference was to create a forum for an exchange of ideas, promising practices, and proven strategies to address the low representation of diverse students in STEM fields in Iowa's secondary and postsecondary programs.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 11 participants from Iowa attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports).

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Iowa had 13 people participate in these webinars.

MINNESOTA

Minnesota experienced a change in leadership this year. On June 14, 2010 Brenda Lyseng, the STEM Coordinator for the Minnesota State Colleges and Universities (MNSCU), returned to her position at Century College due to budget cuts at MNSCU and the elimination of the STEM Coordinator position. The responsibility of State Contact for the STEM Equity Pipeline project was passed to Eva Scates Winston, Equity and Collaboration Specialist at MNSCU. This responsibility was added to her already full agenda resulting in a few changes to the projects implementation. In year two, MNSCU had funded four consortia to participate in the Five Step Program Improvement Process training and implement strategies at their institution. The pilot sites included: Hennepin West (North Hennepin Community College, Hopkins, Wayzata, and Eden Prairie schools), with a focus on engineering; Mid-Minnesota (Ridgewater College, Hutchinson and Gibbon-Fairfax-Winthrop schools), with a focus on engineering and drafting; Southwest Metro (Normandale College, Kennedy and Jefferson schools), with a focus on engineering and manufacturing; St. Paul (St. Paul College, St. Paul Public Schools), with a focus on computer programming, construction, and engineering. After successful strategy implementation in year two, each of these sites was asked to mentor four additional pilot sites with continuing financial support from MNSCU. The St. Paul consortium worked with the Itasca consortium; Hennepin West worked with the Great River consortium, Mid-Minnesota worked with the South Central consortium, and Southwest Metro worked with the Minneapolis consortium. Six webinars were held with these consortia sponsored by MNSCU and conducted by the State Contact. The State Facilitator participated in four of these webinars on September 20, 2010, December 7, 2010, January 4, 2011 and February 1, 2011.

Maintaining communication and using the expertise of the Minnesota State Team has been a challenge this year. The State Team did not meet and the project leadership focused on working with the pilot sites as their priority. The Leadership Team of state staff from MNSCU and the Minnesota Department of Education met with the State Facilitator for technical assistance on August 16, 2010, October 8, 2010, October 15, 2010, November 3, 2010, and December 17, 2010.

Minnesota's investment of Perkins State Leadership funds through a grant process to local consortia pilot site teams is planned to continue into the future and is a strong indication that the project will be sustained. In addition, the STEM Equity Pipeline project collaborated with the Minnesota New Look Project to conduct its training and provide technical assistance. Using a similar pilot site model the New Look Projects in Minnesota are focused on increasing the participation and completion of underrepresented gender students in nontraditional career and technical education programs. According to the State Contact who monitors the implementation of these grant programs and also reviews local Perkins Act applications for basic state grants has seen an increase in the use of local funds to support the implementation of strategies to increase the participation of women in STEM related programs of study. Again more evidence of potential sustainability of the STEM Equity Pipeline efforts.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 6 participant's from Minnesota attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership

Institute participation (see attachments for state team annual reports).

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Minnesota had 23 people participate in these webinars.

STATES IN YEAR FOUR OF IMPLEMENTATION

Five states (California, Illinois, Missouri, Oklahoma, and Wisconsin) were the first states to participate in the STEM Equity Pipeline project. When the implementation model for this project was first developed it was the intention of the project to work intensely with each state for two years and then move on to working with additional states. It became clearly evident that two years was not long enough as these states experienced slow start-up and implementation as the project began and developed its strategy. As a result a supplement was awarded to the NAPE Education Foundation to provide additional support to these states in year three of their participation. Now in year four, all five of these states have continued a relationship with the STEM Equity Pipeline project and staff have continued to provide technical assistance, however not as much as was conducted in the first three years.

CALIFORNIA

California has two state contacts, one from the California Department of Education representing secondary and adult programs, and one from the California Community College Chancellors Office representing community college programs. California is being facilitated by Mimi Lufkin, the Project Director. The project is being sponsored by the California Joint Special Populations Advisory Committee (JSPAC). The JSPAC is a committee comprised of educators from the K-12, adult education, and community colleges as well as business, industry, and the trades who are committed to enhancing the Career and Technical Education field as well as encourage girls and women to explore and enter into training programs and careers that are non-traditional by gender as well as high-wage and high-demand.

On December 1, 2010, Mimi Lufkin attended the JSPAC annual conference and conducted a workshop on the STEM Equity Pipeline project and the program improvement process the project is employing with pilot sites.

The JSPAC meets quarterly and the State Facilitator participates in these meetings remotely to update the committee about national activities related to the STEM Equity Pipeline and to provide any assistance as activities are planned.

The California JSPAC conducted a series of regional meetings across the state and incorporated the training received from the STEM Equity Pipeline Project into these trainings. The State Facilitator provided technical assistance to the two extension agents conducting the training.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 7 participants from California attended representing the state leadership team. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. California had 26 people participate in these webinars.

ILLINOIS

The Illinois Center for Specialized Professional Support (ICSPS) at Illinois State University is funded by the Illinois Board of Education and the Illinois Community College System. ICSPS facilitates the improved performance of special populations' learners in career and technical education by assisting professionals in gaining the knowledge and skills needed for helping every learner to succeed. ICSPS provided the initial leadership to bring together a leadership team who received training in the Five Step Program Improvement Process so each of them, as extension agents, have trained others and shared resources with their communities of practice. Members of the leadership team have conducted the following activities in 2010-11:
- Integrated STEM Equity Pipeline training and resources into the ICSCP's NEW Look Projects who receive monetary awards, technical assistance and professional development to increase the participation and completion of underrepresented gender students in nontraditional career and technical education. New Look Projects use the improvement process. The following pilot sites received training, technical assistance and mini-grant support from ICSPS's NEW Look project in 2010-11: Bement High School, College of DuPage, Danville Area Community College, Lincoln Land Community College, Sauk Valley Community College, Wilbur Wright Community College, Elgin Community College, Olney Central College Learning Center, John Wood Community College, Kaskaskia College, Kishwaukee College, Southwestern Illinois College.
- Extension agents shared STEM Equity Pipeline resources through workshop presentations at Illinois professional development events.
- Disseminated STEM Equity Pipeline virtual learning community resources through the ICSPS and Illinois Office of Educational Services, Illinois Community College and University of IL Chicago listservs for CTE educators.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 5 participants from Illinois attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Illinois had 14 people participate in these webinars.

MISSOURI

Missouri's State Team has developed somewhat differently that the other four states due to a unique professional development model they made available to the project as an implementation vehicle. The Missouri Department of Elementary and Secondary Education, who administers career and technical education at the secondary and postsecondary level in Missouri funds the Missouri Center for Career Education (MCCE). In turn, the MCCE has eight Career Education Coordinators (CECs) located throughout the state whose responsibility includes providing professional development and technical assistance to secondary and community college career and technical education programs. Central to their responsibility is to assist these local education agencies in improving their performance on the Perkins accountability measure requiring the increase in participation and completion of underrepresented gender students in nontraditional career and technical education programs (i.e. women and girls in STEM related CTE programs). Due to this connection the State Director for CTE in Missouri chose to have the coordinator of the eight CECs be the State Contact and have the CECs become extension agents for the project. This is a very focused implementation model that is integrated into an existing system with a shared mission central to our implementation strategy. As a result their State Team consists of the eight CECs and an advisory group that provides advice and resources to the extension agent team (the eight CECs). Also noteworthy is the fact that the STEM acronym in Missouri is not acceptable and all math, engineering, technology and science projects in Missouri use the METS acronym. Therefore the project in Missouri is called the METS Equity Pipeline. We developed a logo for the Missouri project using the acceptable acronym and have also adapted all the project print materials in pdf format using the METS acronym for their use.

Six of the CEC's are continuing to work with pilot sites within their region to implement the strategies they have identified by completing the Five Step Program Improvement Process. The State Facilitator provided technical assistance to the CECs as they implemented the training and assisted them in accessing experts from the Extension Services Group as their needs become apparent. The pilot sites are: Excelsior Springs Career Center, Brookfield Career Center, Columbia Career Center, Linn State Technical College, Current River Career Center, Ozarks Community College, Arcadia Valley Career Technology Center, Clinton Technical College, Perryville Career Center and Crowder College.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 4 participants from Missouri attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Missouri had 2 people participate in these webinars.

OKLAHOMA

Oklahoma has a single state agency that administers career and technical education in the state, the Oklahoma Department of Career Technology Education. The responsibility as State Contact in Oklahoma was given to the Equity Coordinator for CTE. Oklahoma's career and technical education system includes a well developed network of career technology centers around the state where students attend to participate in CTE programs. The leadership group in Oklahoma decided they wanted to focus their efforts with the STEM Equity Pipeline project with professional development staff at the career technical centers with STEM related CTE programs. The following Career Technical Centers received training in the Five Step Program Improvement Process Training in year two of their implementation:

Caddo Kiowa Technology Center, Canadian Valley Technology Center, Central Technology Center, Consultants, Gordon Cooper Technology Center, Great Plains Technology Center, Oklahoma Department of Career & Technology Education, and Tulsa Technology Center, Autry Technology Center, Carl Albert State College, Francis Tuttle Tech Center, Grove High School, Indian Capital Technology Center, Metro Technology Centers, Miami Public Schools, Muskogee ICTC, Ohio State University, Pontotoc Technology Center, , , , Catoosa Public Schools, Indian Capital Technology Center, Konawa High School, Mid-America Technology Center, Moore Norman Technology Center, Northeast Technology Center, NW Tech Center-Alva, Oklahoma CPS, , Stillwater Public Schools, Tahlequah High School, Tulsa Public Schools, , Western Technology Center, and Yukon Public Schools.

After completing year two of the project the Oklahoma State Team decided to not continue to participate during year three. However, the STEM Equity Pipeline staff continued to communicate with those who had participated in the training and monitored the extension of their training through the extension agent reporting process.

The Career Technical Education Equity Council annual conference is held each year in Tulsa, Oklahoma. Although this conference is a national conference a majority of the participants are from Oklahoma. Each year the STEM Equity Pipeline has sponsored a strand of workshops as part of the conference agenda. The conference was held September 16 and 17, 2010 and the following workshops were conducted:
STEM: Increasing the Pipeline for Students in Nontraditional Careers presented by Mimi Lufkin. This workshop helped to identify the root causes and effective strategies for increasing access and success of students pursuing nontraditional careers.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. No participants from Oklahoma attended representing the state leadership team.

The project conducted three national webinars from July 1, 2010 ? July 1, 2011 Oklahoma had 11 people participate in these webinars.

WISCONSIN

Wisconsin's State Contacts for the project are housed in the two agencies that administer career and technical education in Wisconsin: Wisconsin Department of Public Instruction and the Wisconsin Technical College System. The two individuals also serve as the equity coordinators for the state at their respective levels and have many years of experience providing professional development and technical assistance to local education agencies on gender equity issues.
The Wisconsin strategy has been to fund four sites using funds from the Perkins Act State Leadership setaside for nontraditional career preparation. The pilot sites include: Lakeshore Technical College, Manitowoc School District, Plymouth School District and Sheboygan School District.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 7 participants from Wisconsin attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011 Wisconsin had 23 people participate in these webinars.

VIRTUAL LEARNING COMMUNITY

The Virtual Learning Community (VLC) is updated and managed by Greg Nagy, Web Communications Systems Engineer, Center for Special Needs Populations, The Ohio State University. The website address is www.stemequitypipeline.org. The VLC home page has special links to pages of importance, a listing of all upcoming project activities, a list of the last month's activities and links to these posted presentations, and articles and current events of interest. The about us and contacts menus include information about the project, the national staff and state facilitators. The experts menu includes information about how to access the experts, an online request process and individual portfolios for each expert describing their area of specialty and assistance they can proved. The state teams menu includes information about how to form state team and what the state team's roles and responsibilities are. There are pages for each of the state teams identifying the state contacts, announcing any upcoming activities for the state team and links to posted resource materials from state team trainings. The resources menu has archived copies of the monthly Pipeline Press, archived news from the home page, a data base of online resources with over 658 entries and the Five Step Program Improvement Process resource pages. The professional development menu has the STEM Equity Pipeline calendar of events, a page where all past webinars are archived, links to online professional development, a general resources link, a page of promising practices links, information on the Five Step Program Improvement Process, the online professional development needs assessment, a page of research links, a page of project developed professional development tools and the materials use policy.

Website metrics for July 1, 2010 ? June 30, 2011 include
23,017 unique visitors total
16,875 one-time visitors
6,142 repeat visitors
152,151 visitor sessions (the number of times that visitors came to the site)
1,126,679 total hits
March 2011 ? busiest month so far
Tuesday ? busiest day

The VLC also manages twelve listservs: 1) a national listserv of all individuals who have either registered through the website, attending a workshop or training, or has contacted the national office with interest in the project of 3695 members; 2) a listserv for California of 473 members; 3) a listserv for Illinois of 65 members; 4) a listserv for Missouri of 90 members; 5) a listserv for Oklahoma of 325 members; 6) a listserv for Wisconsin of 201 members; 7) a listserv for Minnesota of 124 members; and 8) a listserv for Iowa of 134 members, 9) a listserv for

New Hampshire of 71 members; 10) a listserv for Ohio of 77 members; 11) a listserv for Georgia of 92 members; 12) a listserv for Texas of 120 members. The listservs provide a communication vehicle for project activities at the national and/or state levels.

The VLC includes twelve share point sites, one for the management team and one for each of the state leadership teams. The share point sites allow members of the state leadership teams to: manage a common calendar; post announcements; maintain contacts; post links; send a one click email to all members; post and share documents and more. The state leadership teams have found the sites to be very useful in managing their work.

The VLC prepares and distributes on the national listserv the Pipeline Press at the end of each month. The Pipeline Press contains current events, articles, resources, funding announcements, and links that are of interest to participants working on gender equity in STEM. All issues of the Pipeline Press are archived on the VLC at www.stemequitypipeline.org

PROFESSIONAL DEVELOPMENT

The project has developed an online professional development needs assessment that can be found on the VLC. This needs assessment has been conducted with the State Teams as part of their initial kick-off meeting. Outreach to other individuals in each of the states has been done through the listservs and website to get interested individuals to complete the needs assessment. The results of the needs assessment have been used to identify webinar topics and workshop topics specific to State Team needs.

WEBINARS
The project hosted three national webinars: 1) January 27, 2011 Spark Talented Minority Girls' Interest in Engineering, Female Recruits Explore Engineering ??' The FREE Project conducted by Monica Bruning had 92 attendees; 2) February 16, 2011 Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets conducted by Fred Smyth had 65 attendees, and 3) March 22, 2011 Cognitive Beliefs and Cultural Variables Matter in STEM Career Development conducted by Angela Byars-Winston had 109 attendees.
All three of these webinars are archived on the VLC. Webinar evaluation results can be found in the findings section of the annual report.

PROFESSIONAL DEVELOPMENT INSTITUTE

April 11-14, 2011 - The National Alliance for Partnerships in Equity held their annual conference. The conference was held in Arlington, VA and included four days of professional development. The conference program is included in the attachments.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011. 79 participants from the eleven participating states attended. The goals of the day's activities were: 1) to provide participants the opportunity to network, share and learn from one another about the strategies that have been working; and 2) to provide feedback to the project staff about the project's design and efficacy as part of a larger strategic planning effort focused on sustainability.

On Tuesday, April 12 and Thursday, April 14, 2011 the STEM Equity Pipeline sponsored a series of workshops:

Increasing the Participation of Persons with Disabilities in STEM Fields
Presenters: Elissa Poel, Co-PI, New Mexico State University, Las Cruces, NM; Jessica Schmidt, Graduate Research Assistant, Regional Research Institute on Human Services at Portland State University, Portland, OR
The presenters described (1) the efforts of Reaching the Pinnacle to increase the numbers of persons with disabilities in STEM fields through advocacy, engaging learning activities, research, faculty involvement, and transition and employment options and (2) the results of a study to determine the impact of a STEM mentor program for high school students.

The NAF Career Academy Model as an Effective STEM Education Strategy
Presenters: Deanna Hanson, National Network Services Director, National Academy Foundation, New York, NY and Brenda Barry, Director, Academy of Engineering, National Academy Foundation, New York, NY
This presentation described NAF's model of career-themed academies that provide underserved high school students with access to industry-specific curricula, work-based learning experiences, and relationships with business professionals.

Promoting Career Pathways for Women in the Green Economy
Presenters: Karen Furia, National Office Coordinator, Women's Bureau, USDOL, Washington, DC; Lauren Sugerman , Women and Work Project Director, Wider Opportunities for Women, Washington, DC; and Donna Addkison, Director, Family Economic Security Program, Wider Opportunities for Women, Washington, DC
The presenters discussed (1) USDOL's 'Why Green Is Your Color: A Women's Guide to Sustainable Careers' and government-funded training

projects in green construction, renewable energy, and energy efficiency, particularly those of Vermont Works for Women and (2) the tools, resources, and strategies of WOW's Green Institute and Pathways to Poverty project.

The Importance of Partnerships in Regional STEM Education Initiatives
Presenters: Timothy Nolan, Executive Director, Greater Cincinnati Tech Prep Consortium, Cincinnati, OH; Janice Urbanik, Construction Career Pathway Manager, Greater Cincinnati Workforce Network, Cincinnati, OH; and Kathy Wright, Program Facilitator, CPS Hughes STEM High School, Cincinnati, OH; and Shi O'Neill, IT Pathway Consultant, Greater Cincinnati Tech Prep, Hamilton, OH; Amy Harrelson, Director of Grants & Work Readiness, Heart of Georgia Technical College, Dublin, GA
The presenters described (1) how education, business, and industry partners formed a regional career academy that will ready students for entry-level industrial positions or additional career-oriented training and (2) how Greater Cincinnati has organized a team of 10 professionals to develop a systematic and regional STEM equity pipeline.

GUESS What? This Experiment is 'Sick'!
Presenters: Carrie Leopold, Outreach Coordinator, North Dakota State College of Science, Fargo, ND
This presentation explained why girls participating in GUESS, Girls Understanding and Exploring Stem Science, are calling their experiments 'sick' and why that's not a bad thing!

The National Girls Collaborative Project: Using Collaborative Tools to Increase Gender Equity in STEM
Presenters: Karen Peterson, Principal Investigator, National Girls Collaborative Project, Lynnwood, WA and Amy Foster, National Program Manager, National Girls Collaborative Project, Lynnwood, WA, Bria McElroy, Assistant Director, Women in Engineering, A. James Clark School of Engineering, University of Maryland, College Park, MD
This presentation showcased the strategies and tools employed by the National Girls Collaborative Project to strengthen the capacity of organizations serving girls in STEM.

Two State Models for Supporting NTO Careers Choices in STEM
Presenters: Eva Scates-Winston, Equity & Collaboration Specialist, MN State Colleges & Universities, St. Paul, MN; Karen Showers, Education Director, Counseling and Student Services , Wisconsin Technical College System , Madison, WI; Kari Krull, Career and Technical Education Coordinator , Manitowoc Public Schools, Lincoln High School , Manitowoc, WI; and Judy Stanton, Education Services, Lakeshore Technical College, Manitowoc, W
Presenters from Minnesota and Wisconsin shared how their states are integrating the strategies and processes of the STEM Equity Pipeline and the New Look projects and are applying a 'whole college' approach to supporting NTO career choices in STEM.

SECURE IT: Strategies to Encourage Careers in Cybersecurity and Information Technology
Presenters: Davina Pruitt Mentle, Ex Director/Sr Researcher, Ed Tech Policy, Research and Outreach/CyberWatch, Clarksville, MD and Portia Pusey, Assistant Director, ERPRO/CyberWatch, MD
This presentation explored programs and initiatives that are in place to support the development and advancement of 'Careers in Cybersecurity.'

High-Tech High Heels
Presenter: Tegwin Pulley, Executive Director, High-Tech High Heels: Retired Vice President, Texas Instruments, Tegwin Pulley, Inc., Dallas, TX
This presentation discussed the High-Tech High Heels' 3-pronged approach ? teacher and counselor professional development and student camps - through a public partnership between business and education with proven results in preparing and encouraging high school girls to pursue STEM careers.

Inspiring Students to Explore STEM Education and Careers
Presenter: Yvonne Perez, Career Pioneer Network Facilitator, Idaho State University, College of Technology, Center for New Directions, Pocatello, ID and Marling Darling, CND Equity Counselor, Idaho State University, College of Technology, Center for New Directions, Pocatello, ID; Bill Hatch, Civil Rights Coordinator/Special Populations Consultant/Gender Equity Consultant, North Carolina Department of Public Instruction, Raleigh, NC
The presenters discussed Idaho's Career Pioneer Network and North Carolina's multi-partner initiative, whose goals are to inspire students of all ages to explore and pursue STEM courses of study and careers.

On Thursday, April 14 the STEM Equity Pipeline Leadership Institute luncheon speakers included Rebecca Spyke Keiser, Associate Deputy Administrator for Policy Integration, National Aeronautical and Space Administration and Kumar Garg, Policy Analyst, White House Office of Science and Technology Policy. This session was focused on federal programs and policies that support educational initiatives for increasing the engagement of women and girls in STEM fields. Members of the National Advisory Board (NAB) and representatives from the STEM

Equity Pipeline state teams participated in the luncheon which included time for dialogue and sharing with members of the STEM Equity Pipeline NAB.

MICROMESSAGING TO REACH AND TEACH EVERY STUDENT BLUEPRINT

In April 2010, the NAPE Education Foundation received a supplement to the STEM Equity Pipeline project to develop a blueprint for a high-quality research-based educator professional development program to address gender- and culturally based implicit biases that occur in the classroom and that are manifested through 'micromessages.' The development of this blueprint has resulted in the securing of additional private source funding to create the curriculum and implement it in the Dallas/Fort Worth area. The blueprint can be found in the attachments.

Findings: (See PDF version submitted by PI at the end of the report)

NSF REPORT ON STEM EQUITY EVALUATION WORK

This section describes the results of data collected during Year 4 for purposes of program evaluation by MPR Associates (MPR). The evaluation was designed to accomplish three major goals: (1) to provide useful and actionable feedback for the STEM Equity Pipeline project team regarding the quality and effectiveness of training and services; (2) to synthesize feedback on the tools and processes developed as part of this project; and (3) to provide evidence of implementation success and impact on student and teacher outcomes.

Summary of findings:

Overall summary

From the its start in October 2007 through June 2011, the STEM Equity Pipeline Project has reached thousands of individuals through a variety of settings and communication tools. Services offered by the project? including 5-Step Program Improvement Process training workshops and webinars?have had 4,305 participants, with 858 participants in Year 4. As extension agents, the participants reported sharing what they had learned with an estimated 10,000 individuals during Year 4 through informal sharing with colleagues, career fairs and conference events, and listservs and other media.

Participants regarded project services and materials to be of consistently high quality, and the content useful for both pilot site and state-level project-related activities and in their own work. As in past years, the 21 events offered by the project in Year 4 were rated favorably by participants, with uniformly high average ratings of 3 or better on the evaluation survey items on a 4-point scale (1- strongly disagree, 4-strongly agree). In interviews, project participants described the training as 'excellent' and as providing tools that would enable them work through the 5-Step Process and also to advocate for STEM Equity with colleagues and the leadership in their institutions and states.

In terms of outcomes, interviews with project participants indicate that the project is increasing the engagement and interest of participants in gender equity in STEM. Project participants reported greater awareness of and engagement with opportunities to promote gender equity in their work, as well as increased interest among colleagues in gender equity issues. Quantitative data on program enrollments by gender suggest that the project activities have contributed to an increase in the number of female participants in STEM-related CTE programs in at least two of the pilot sites. It is difficult to definitively attribute changes in female program participation rates to project-related activities, due to data limitations. However, these findings are supported by interviewees who have reported increased interest by students in STEM fields at their institutions, as well as upticks in female participation in STEM-related courses and extra-curricular activities that they attribute to project efforts.

Summary Details

As indicated by the summary participant statistics noted above, the Pipeline Project has reached thousands of individuals through a variety of formats. As of Year 4, some 50 pilot sites are engaged in the 5-Step Process in 9 of the 11 states that have participated in the project, and more than 70 secondary schools and postsecondary institutions have participated in pilot site activities. The project's virtual learning community (VLC) is also very active: the live project webinars have had 1,410 attendees and the archived webinars 359, the STEM Equity Pipeline Website has had 1,126,679 hits, and the listserv 3,695 members (all VLC numbers duplicated).

During Year 4, a total of 339 evaluation surveys were administered to participants at 21 virtual and in-person events. All of the events were received favorably by participants, with uniformly high average ratings of 3 or better on the survey items on a 4-point scale (1- strongly disagree, 4-strongly agree). Some of the respondents included comments in response to open-ended questions; these responses were also uniformly positive and included indications that their participation had suggested concrete steps that they could take to promote STEM equity at their home institutions. The more than 20 participants interviewed in Year 4 also praised project services and materials and reported finding the training workshops valuable. Through the project's Extension Agent Survey, some 95 individuals that participated in project activities reported sharing what they had learned though informal interactions with colleagues, events, and listservs and newsletters that reached an estimated 10,393 individuals in Year 4.

The Year 4 interviews with state-level and pilot site project participants indicate that their involvement in the project has increased their engagement and interest in STEM equity and increased their comfort and facility in working with data for program improvement. Additional outcomes reported by interviewees included heightened interest in and awareness of STEM equity issues among faculty and increased interest in STEM-related programs among female students. Finally, the interviews with individuals from the states that joined the project in Years 1 and 2 and have since completed the two years of intensive project services revealed sustained engagement with STEM Equity issues and continued

project activities. Project participants have reported continued work with the 5-Step Process and ongoing engagement with the implementation and evaluation of strategies to increase female participation in STEM fields.

Finally, the evaluation team has worked with states and pilot sites to collect quantitative data on participation and completion rates by gender in STEM-related CTE programs nontraditional for females. This effort has revealed a number of limitations regarding using these data to assess program outcomes. These limitations include privacy laws limiting access to statewide and local site data, volatile enrollment numbers that vary widely from year to year, and changes in data systems that that hinder multi-year comparisons. Nevertheless, analyses of multi-year data at two of the pilot sites revealed modest but steady increases in the number of females participating in or completing STEM-related CTE programs, suggesting that the program may be having an impact on female involvement in these programs.

Data Collection Methods

The following data collection strategies were used to collect data on project implementation and outcomes during Year 4:

Tracking of Participant Numbers and Evaluations of Events and Webinars and Viewership of Archived Webinars

As in previous years, the project collected participant numbers for project services and feedback data on all major in-person events and webinars. The evaluation team developed, administered, and analyzed event evaluations from the 21 on-site and virtual events (including webinars) offered directly by the project staff in Year 4. This year's analysis also includes viewership statistics on 17 archived webinars that project participants and others can access on the Pipeline Project Website at any time. Since this is the first year that the evaluation team has analyzed the data, the report summarizes data for all the year, from the first recorded view in August 1, 2008 to June 30, 2011.

Extension Agent Survey

To understand how project participants share the information and training offered by the project's staff with others, a Web-based Extension Agent Survey was initiated in March 2009. Periodic reminders to the project's listserv prompt participants to report on their extension of services beyond the work conducted by core facilitators. In Year 4, some 126 surveys were completed by 95 individuals who had participated in project services and then went on to share what they learned in their own settings. These activities included in-service training sessions, conference and workshop presentations, newsletter and listserv communications, and other ways of sharing information that together reached an estimated total of 10,400 individuals. A summary of our analysis of these reports for Year 4 is included in this report.

Since this is the second to last year of the project, this report also includes a summary of extension agent survey data collected since Year 2. Over the 2.5 years that these data have been collected, 326 surveys have been completed, and the activities reported reached an estimated 18,900 individuals. The summary includes information on the types of events through which information has been shared and the states of the survey respondents for each year.

Pilot Site Participant Survey

In Years 3 and 4, the project shifted from training state-level extension agents to a focus on providing 5-Step Process training and facilitation with teams at local pilot sites. This occurred after collecting data on the results of state-level training and determining that more concentrated work at the local level might have greater potential to bring about desired results, i.e., changes in participation rates of females in nontraditional courses. To gather information about pilot site participants' knowledge of and past experiences with STEM equity work, 75 attendees at the first 5-Step training workshops held in Georgia, New Hampshire, Ohio, and Texas were asked to complete a short background survey. The survey asked participants about their familiarity with a variety of STEM equity-related topics, as well as whether they have received professional development on STEM equity or participated in projects designed to promote the same. After two years, the same participants will be asked to complete a post survey, and the results will be analyzed to explore how participation in the project changed their knowledge of and commitment to STEM Equity.

Interviews with State-level and Pilot Site Participants

To gain an in-depth understanding of participants' experiences in the Pipeline Project, the evaluation team conducted a total of 20 telephone interviews with from one to four pilot site or state-level project participants from nine of the eleven participating states. The nine states are those either in the first two years of the project, or state that have completed two years in the project and have maintained project-related activities and/or pilot sites. Oklahoma was excluded because project-related activities in the state are no longer ongoing. In Illinois, 5-Step Process activities are continuing in conjunction with the New Look project, and the evaluation team has plans to follow up with a number of New Look sites in the fall.

The interviews addressed state and pilot site teams' accomplishments and challenges, participants' perceptions of the quality and value of the project's services and materials, and project sustainability. The analysis resulted in a list of implementation and outcome findings and six themes related to the goals of the project that were developed from the interviewees' responses. The six themes are: understanding and using data; awareness of and commitment to STEM equity issues; quality of project services and resources; partnerships; accomplishments; and project sustainability. The findings and themes will inform the project's activities as well as the work to be conducted with states and pilot sites during the fifth and final year of the project.

Quantitative Data Collection

As in previous years, the evaluation team collected quantitative data on the number and percentage of female participants and completers (or concentrators, depending on data availability) in STEM-related CTE programs associated with occupations that are nontraditional for females. The team collected data from state-level sources (CTE data analysts or Web-based data archives), with the exception of several states (Illinois, Minnesota, Ohio, and Texas) in which data privacy restrictions limited the collection and use of state-level data at the secondary, postsecondary levels, or both. In these states, state facilitators are working with the evaluation team to collect data directly from the participating sites. Data collected were analyzed and will be used for benchmarking in training, to analyze female participation and completion rates in STEM CTE

programs, and to gauge program impact.

Project Participation Numbers

The Project activities have reached thousands of individuals that have participated by attending national, state, and pilot site in-person events, logging onto a webinar, or by using the project Website. From Project Years 1 to 4 (through 2011), the number of participants in any project training activity reached 4305, including some 648 participants in in-person 5-Step Program Process Improvement Training workshops offered by the project staff. The number of participants in Year 4 was somewhat lower than the 205 recorded in Year 2 and 245 in Year 3, reflecting the fact that relatively fewer states were still in their first two years of project activities in Year 4, and that training in Texas was completed in Year 3. Some 50 pilot sites are engaged in the 5-Step Process in 9 of the 11 states that have participated in the project, and more than 70 participating secondary schools and postsecondary institutions have participated in pilot site activities. The project's virtual learning community is also very active: the live project webinars have had 1,410 attendees and the archived webinars 359, the STEM Equity Pipeline Website has had 1,126,679 hits, and the listserv 3,695 members (all numbers duplicated). Finally, the STEM Equity Pipeline Leadership Institute held in Washington, DC in April 2011 had 79 participants, and 160 individuals attended the NAPE Professional Development Institute that followed.

Event and Activity Evaluations

As in the first three years of the NAPE Stem Equity Project, surveys were distributed at the end of events offered by project staff to ascertain attendees' attitudes related to the content of the event, accomplishment of objectives, contribution to progress on their own goals, and topics of information they would like to learn more about. Events for which evaluation surveys were used included training workshops and meetings in participating states, national events and the leadership institute, and webinars. A total of 339 evaluation surveys were collected for 21 events conducted throughout Year 4 (Table 1).

[See Findings Attachment for Table 1]

Events Conducted in Project States

The majority of events surveyed were state meetings and 5-Step Process training workshops. A total of 16 such events were evaluated in Year 4 (evaluation forms are included in the appendix). The evaluation survey questions covered participants' self-reported understanding of material covered in the event, such as gender equity awareness and general project information, and their ability to use what they have learned, including confidence in carrying the project forward, working with data within the 5-Step Process, and knowledge about project resources available. Several evaluation survey questions were repeated across most or all of the events to provide an overall sense of participants' perceptions of project events (Table 2). These questions are presented in the form of statements to which the respondent must indicate their level of agreement. Table 2 shows how many event surveys included each statement, and the average rating on a four-point scale, where 1=strongly disagree, and 4=strongly agree. Average responses were 3.3 or higher, and the highest rating (3.6) was for 'The materials provided (e.g. handouts) will be useful for my work.' The lowest rating (3.3) was found for, 'I have ideas about how to use the information learned in my pilot site,' but the score still indicates that participants on average agreed with the statement.

[See Findings Attachment for Table 2]

Aside from the common questions summarized in Table 2, evaluation surveys also included a number of scaled and open-ended response questions that were customized to fit the content of each event. As was the case for the common questions, on average, respondents indicate that they agreed or strongly agreed with all of the statements, with average ratings of 3 or better. Responses to open-ended questions were also positive and provided information on what the participants planned to do with what they learned, as well as suggestions for improvements and future events. The following section summarizes each event surveyed, including a brief description of the event, the number of participants, and selected and representative survey results.

Events in States Participating in the Project

Georgia

November 16, 2010

A training workshop on the 5-Step Process (all steps) was held at Southwest Georgia Technical College in Thomasville, Georgia. The event was led by the Georgia state facilitator, Claudia Morrell, and Mimi Lufkin. Twenty-two attendees from pilot sites around the state participated, and 19 completed an evaluation survey.

Based on the responses, participants agreed that the training gave them a better understanding of the 5-Step Process, accountability data, and root causes (average ratings 3.4, 3.4, and 3.5, respectively). In addition, participants left the session with an understanding of how to write objectives for their pilot sties and develop their implementation plan, as well as with ideas of what to do next at their pilot sites (average ratings 3.3, each). At the end of the survey, participants were asked to write a brief description of what they will do next as part of their involvement with their pilot sites, and 12 answered. About half indicated that they would seek additional information, and about half indicated specific steps related to the 5-Step Process or promoting gender equity in other ways. Representative responses included:

? 'I will browse different hyperlinks regarding strategies and evaluation surveys.'

? 'Review the assessments and other tools that can be used in conjunction with surveys.'

? 'Pull additional data to help better determine root causes.'

? 'Incorporate STEM activities in our college-wide strategic planning.'

? 'Create an evaluation survey to determine pre- and post-activity awareness.'

May 10-11, 2011

The state facilitator for Georgia, Claudia Morrell, held a meeting for pilot site participants at the Heart of Georgia Technical College in Dublin, GA. The meeting reviewed the 5-Step Process and discussed survey design and the development of effective marketing materials for recruiting

females in STEM programs. The session had 10 attendees, and 8 completed an evaluation survey.
The event was rated highly by the survey respondents, who reported that the session gave them a better understanding of the 5-Step Process and provided resources and ideas for their future work around STEM equity (average ratings 3.4 and 3.9, respectively). Participants strongly agreed that the discussion of their colleges' plans helped them to better understand options for identifying and addressing the needs of students pursuing nontraditional careers (average rating 3.6). Further, participants strongly agreed that the discussion of marketing, social media, and brochure development gave them ideas for developing resources that they can use, including webinars (average rating 3.8).
Iowa
July 6, 2010
As part of the requirement that all Iowa community colleges participate in the 5-Step training as a condition for receiving a state discretionary grant funded out of Perkins, a workshop was conducted by Courtney Reed-Jenkins, the state facilitator, at Iowa Lakes Community College in Emmetsburg, IA. Three of the sixteen community colleges attended this workshop, during which steps 1-4 were covered. During the workshop, each college identified programs to focus on during the school year, identified root causes and began to select strategies to address those causes. Five of the session's 10 attendees completed an evaluation survey.
The survey results indicated that the respondents found the workshop to be well-organized and useful overall (average rating 3.8, each). Participants agreed that they will be able to use the data presented (or similar data) to identify gaps in performance between different groups of students, and that they have an idea of what data sources they can use to identify those gaps (average rating 3.4, each). They also felt that the workshop gave them an increased understanding of current root causes research related to participation and completion of women and girls in STEM (average rating 3.6). Lastly, participants agreed that they have a better understanding of how to evaluate strategies, how to match strategies to the identified root causes, and how to identify resources for researching potential solutions that can be implemented (average ratings 3.4, 3.4, and 3.6, respectively).
August 5, 2010
As part of the requirement that all Iowa community colleges participate in the 5-Step training as a condition for receiving a state discretionary grant funded out of Perkins, Courtney Reed-Jenkins held a workshop on steps 1-4 of the 5-Step Process for administrators and faculty members from 7 Iowa community colleges at the Des Moines Area Community College in Ankeny, IA. The session had 36 attendees and 20completed an evaluation survey.
Survey responses were generally positive and respondents felt that what they learned in the workshop would be useful to their work related to gender equity (average rating 3.3). Participants reported that the workshop provided them with an increased understanding of the root causes identified in research on participation and completion of women and girls in STEM (average rating 3.4). When asked about their own research and evaluation, participants agreed that they will be able to use the resources and tools identified in the session to conduct their own action research to identify potential root causes (average rating 3.4). At the end of the survey, participants were asked to provide a brief description of something they will do as a follow-up to the meeting. The eight responses included:
? 'Write my grant. Plan a signature event to address leaks in the pipeline.'
? 'Discuss with students, faculty and high schools possible implementation strategies.'
March 25, 2011
Another workshop took place at Eastern Iowa Community College, Davenport, IA. The training was conducted by Courtney Reed-Jenkins and was designed to train K-12 Counselors and EICCD full time Advisors to work with underrepresented populations. 18 career and guidance counselors from around the state attended, and 17 completed a survey.
The session was reviewed favorably by the survey participants. Participants agreed that they understood the trends of female students in STEM classes, including career and technical education and post-secondary (average rating 3.4). They also agreed that they can identify 'bridge' or 'transition' points for females in STEM classes and careers, and that they learned the differences between female and male students in nontraditional careers (average ratings 3.3, each).
At the end of the survey, participants were asked to provide a brief description of something they will do as a follow-up to the meeting, and seven participants answered this question. Responses included:
? 'Explore more opportunities (websites) for girls to use when doing the career exploration unit.'
? 'Actively engage and encourage male and female students to explore opportunities in the nontraditional career arena.'
? 'Discuss with other counselors about the risk of biased counseling. Re-assess techniques I am using to be sure of being unbiased.'
? 'Will continue doing job, I feel I have addressed nontraditional career opportunities for the female students I meet.'
? 'Develop a girl-focused STEM career event.'
New Hampshire
September 21, 2010
The state facilitator for New Hampshire, Mimi Lufkin, held a workshop for pilot site participants at Granite State College, Concord, NH on the 5-Step Process. 17 state members attended the session, and 16 completed an evaluation survey.
Based on the survey responses, the workshop was viewed favorably by the participants, who felt the session was well organized and that the materials would be useful in their work (average ratings 3.5 and 3.4, respectively). The event gave participants a better understanding of the 5-Step Process, accountability data, and root causes (average ratings 2.9, 2.8, and 3.0, respectively). Most participants agreed that they understand the components of the 5-Step Process and will be able to implement steps 1 and 2 at their pilot sites (average rating 2.9). In addition, participants left the workshop with ideas of what to do next and reported that it helped them understand the need to conduct surveys at their

pilot sites (average rating 3.1). Among the 15 participants' responses indicating what they will do as a follow-up to the meeting were the following statements:

? 'I want to look at 5-Step change process and its adaptability to implementation of new initiative planning.'
? 'Take a look at individual sites to identify areas to focus on.'
? 'We will develop surveys to determine root causes.'

September 22, 2010

The state facilitator for New Hampshire, Mimi Lufkin, conducted a training session focused on providing professional development for STEM educators at Granite State College in Concord, NH. During the session, participants learned about the STEM Equity Project, the 5-Step Process, and about available resources available on STEM equity issues. The meeting had 16 attendees and 13 completed an evaluation survey.

The survey respondents strongly agreed that they understand the purpose and goals of the Pipeline Project (average rating 3.8). They also agreed that they now have a basic understanding of the 5-Step Process, and that the literature review on root causes research will be useful to them in their work on gender equity (average ratings 3.2 and 3.4, respectively). In addition, participants felt that the workshop increased their understanding of the importance and relevance of gender equity work and helped them develop new ideas about how they will be able to promote and disseminate information and resources about STEM Equity in the state (average ratings 3.5 and 3.4, respectively). At the end of the survey, participants were asked to share any additional comments. Responses included:

? 'Thank you for providing so many resources, ideas and practical activities. I enjoyed this thoroughly!'
? 'I would love to see a workshop where people in NH could come together to share what they are doing specifically and successfully to increase nontraditional participants to STEM programs and how they are getting teacher involvement.'
? 'The second day helped solidify ideas I had learned from the first day. Have lots of ideas to share with non-traditional coordinators, etc.'

February 23, 2011

Project participants convened for a workshop held at Plymouth Graduate Center, Concord, NH on steps three through five of the 5-Step Process led by Mimi Lufkin. The workshop had 13 attendees, and 11 completed an evaluation survey.

Based on the survey responses, participants agreed that they learned about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.5 and 3.4, respectively). They strongly agreed that as a result of this session, they know how to find Web-based resources to help them identify and plan an implementation strategy based on their identified root cause(s) (average rating 3.8). They also now know the difference between a summative and formative evaluation and the importance of both (average rating 3.4). In addition, participants left the session with ideas of what to do next at their pilot sites (average rating 3.5).

Ohio

October 15, 2010

The state facilitator for Ohio, Katherine Weber, held a workshop for project participants at Washington State Community College, in Marietta, OH, on steps 1 and 2 of the 5-Step Process. During the training, the team decided on a possible root cause and created an action plan to investigate the potential cause. The workshop had 11 attendees, and 10 completed an evaluation survey.

Survey responses were very positive for this event. Participants strongly agreed that they understand the components of the 5-Step Process and will be able to implement steps 1 and 2 at their pilot sites (average rating 3.6). They also agreed that they gained a better understanding of documenting performance results, CTE accountability, and of how to look at trends and patterns in their districts' data (average ratings 3.4, 3.6, and 3.6, respectively). At the end of the survey, participants were asked to write a brief description of a concrete step that they will do next as part of their involvement with their pilot sites. The nine responses to this question included:

? 'Meet to learn steps 3 to 5.'
? 'Collect names of my non-traditional students to participate.'
? 'Become more aware of how I deal with students, how they deal with each other, classroom, environment, etc.'
? 'Review causes of data discrepancies.'
? 'Will talk up the pilot site implementation at the state level.'
? 'Focus groups/surveys.'
? 'Complete benchmarking of a program vs. 4 other institutions.'

October 25, 2010

The state facilitator for Ohio, Katherine Weber, held a workshop at Cincinnati Nature Center in Cincinnati, OH on the 5-Step Process. The purpose of the training was to provide the Five Step Program Improvement Process training on Steps 1 and 2. 23 state members attended the session, and 16 completed a survey.

Participants responded very favorably to the training. Almost all respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.4). They also strongly agreed that the materials provided were useful for learning what they need to know and do as part of their pilot site work (average rating 3.5). The participants agreed that the exercises that were included in the discussion of root causes helped their understanding and felt that they got ideas about how they can use what they learned in their work with their pilot sites (average ratings 3.1, each). Lastly, participants were asked to share any additional comments about the training. Several respondents mentioned that they enjoyed the training. One respondent felt it would have been useful to better understand the data they were looking at in the training.

February 28, 2011

A workshop on steps three through five of the 5-Step Process was held in Cincinnati, OH. 10 project participants attended the session, and 8 completed a survey.

The evaluations indicated that participants strongly agreed that the workshop taught them about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.8 and 3.5, respectively). They also strongly agreed that they learned about new tools to help them with project management that will help them implement their selected strategies (average rating 3.6). They also indicated that they have ideas about how they can use what they learned at the training in their work at the pilot sites (average rating 3.6). At the end of the survey, participants were asked to provide questions or note issues that they are unsure about. Three participants listed items and these were:

? 'Evaluation tools that lead to true measure of outcome.'

? 'About objectives and choosing strategies as well as validating root causes.'

? 'I'm a little unsure about the process, but I know I can get help when I put it together.'

April 8, 2011

The state facilitator for Ohio, Katherine Weber, held a workshop at Sinclair Community College in Dayton, OH on steps 3-5 of the 5-Step Process. Six pilot site participants attended the session, and all of them completed an evaluation survey.

The evaluation survey responses indicated that participants agreed that the workshop was well organized and that the materials would be useful to them in their work (average ratings 3.6 and 3.3, respectively). Participants strongly agreed that they had learned about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.5 and 3.7, respectively). Participants strongly agreed that they now know how to write a SMART objective (average rating 3.6). The survey also asked participants to write a brief description of something that they will do next as part of their involvement with their pilot sites. The five responses to this item included the following two:

? 'Work on our identified strategy to collaborate with partners to gather data around non-traditional recruitment and hiring practices and opportunities.'

? 'Sustain engagement with the project.'

May 6, 2011

The state facilitator for Ohio, Katherine Weber, held a workshop at Washington State Community College in Marietta, OH on steps 3-5 of the 5-Step Process. The facilitator used focus group data collected from the pilot site to demonstrate the steps. Six project participants attended the event, and all of them completed an evaluation survey.

The survey respondents strongly agreed that they learned where there are lots of web-based resources to help them identify and plan an implementation strategy based on their identified root cause(s) (average rating 3.6). Participants also agreed that they learned about new tools to help them with project management that will help them implement their selected strategies and that they have ideas about how they can use what they learned at the training in their work at the pilot sites (average ratings 3.2 and 3.6, respectively). Descriptions of what participants would do as a follow-up to the meeting were:

? 'Investigate the possibility of female engineering cohort.'

? 'Write a SMART objective for what I want to accomplish.'

? 'Involve STEM in current projects.'

Texas

October 5-6, 2010

The state facilitator for Texas, Susie Wheeler, and Mimi Lufkin held a meeting for project participants at the Texas Association of College Technical Educators (TACTE) Conference in Austin. The session was the first meeting of the four community colleges selected to participate as pilot sites (with secondary partners) in the Pipeline Project in Texas. The purpose of the meeting was to review the 5-Step Process and to set deadlines for each phase. Eight state members attended the session, and 6 completed an evaluation survey.

Participants responded well to the meeting. All respondents strongly agreed that the training reflected careful planning and organization (average rating 4.0). They also strongly agreed that the materials provided were useful for learning what they need to know and do as part of the 5-Step Process as their sites (average rating 4.0). Further, they strongly agreed that the session improved their knowledge of the 5-Step Process (average rating 4.0). They also indicated that they understood the expectations for the pilot sites and what they will need to do to evaluate the work (average rating 3.8). The respondents felt that the session helped them to develop a plan for moving ahead with work in the pilot sites, and that they have ideas about how they can use what they learned at the training (average ratings 3.8, each).

Wisconsin

August 12, 2010

Project participants convened for a planning meeting at Lakeshore Technical College in Cleveland, WI. The session focused on coordinating and planning future activities.10 state members attended the session, and 8 completed an evaluation survey.

Based on survey results, participants agreed that the discussion of the calendar was efficient and productive, and that it resulted in a clear set of dates for events (average ratings 3.1 and 3.4, respectively). They also agreed that they were able to set priorities for project activities based on their groups' interests, and that the groups were able to determine several interests that they could pursue collaboratively (average ratings 3.5 and 3.6, respectively). In addition, participants felt that they were able to identify lead coordinators and set dates for the next events as well as

create action plans for all activities (average ratings 3.5 and 3.1, respectively). At the end of the survey, three participants shared additional comments. All were positive and included:

? 'Very productive. Appreciated the input from the Girl Scouts and 4-H representatives - very helpful!'

? 'Excellent meeting - good work - lots of great ideas and activities to pursue.'

STEM Equity Pipeline National Leadership Institute

April 10, 2011

State team and pilot site leaders met at the National Leadership Institute on April 10, 2011, at the Doubletree Hotel in Crystal City, VA. The meeting was facilitated by Mimi Lufkin and members of the STEM Equity Pipeline Team and brought together state and pilot site team leaders from different states to enable them to meet one another and learn from the experiences of other states. The training session included presentations by team leaders who shared successes and challenges as well as set expectations for the project. Attendees participated in small and large group discussions in addition to the presentations. 79 project participants attended the session, and 59 completed the survey.

At the beginning of the survey, participants were asked to indicate which state they were from and to list their position or role. Of the 59 respondents, 57 indicated their state. The states with the most representatives were GA (11), OH (7), NH (6), CA (5), IA (5), MN (5), and WI (5). The other represented states were IL (4), MO (3), TX (3), ID (2), and CO (1). A variety of positions and roles were listed by the participants. The most frequently listed positions included Special Populations Coordinator, CTE Coordinator, Perkins Coordinator, and involvement in vocational education and career counseling.

In the evaluation survey, respondents strongly agreed or agreed that they learned implementation strategies from other states (average rating 3.6). Respondents also agreed that learning about other states' experiences with the project gave them ideas for addressing challenges in their own states (average rating 3.5). In addition, participants felt that they benefited from networking with other states during the institute (average rating 3.6). Most participants agreed that they now know more about the role of participating states in the collection of data for the project evaluation (average rating 3.1). They also generally agreed that they developed a better understanding of how the national context and social climate impact gender equity work (average rating 3.3). At the end of the survey, participants were asked if they would read a STEM Equity Pipeline blog if one was made available on the project website, and if so, to state which topics they would like to see covered. Most participants agreed that they would read the blog (average rating 3.2) and many topics were suggested, including the following:

? 'Innovative strategies for STEM participation and STEM program retention'

? 'Collaboration of education, business and industry, rural pops versus urban pops, socioeconomic challenges - what to do??'

? 'Data, benchmarking, performance targets and best practices'

? 'Tool kits; step by step strategies.'

? 'Research, pilot projects, best practices'

Other Events

Kansas

September 20-21, 2010

A meeting was held for individuals interested in the Pipeline Project at the Greenbush Center for Staff Development inWichita, KS. The session focused on nontraditional participation and completion focusing on stereotypes/changing unconscious bias and ways to increase awareness of NTO's. The event had 75 participants, and 50 completed an evaluation survey.

The evaluation responses were positive. Respondents agreed that the session gave them a better understanding of how to identify appropriate data, how to evaluate potential root causes and solutions, and provided them with information about available resources (average ratings 3.2, 2.9, and 3.1, respectively). In addition, participants left the session with ideas of how to improve STEM equity in their own schools.

At the end of the survey, participants were asked to write a brief description of something they would do next as a follow-up to the meeting, and 21 respondents included this information. The most frequently mentioned actions were sharing what they learned at the session with other CTE staff, further examining their own data and programs, and taking steps to increase the recruitment for women and girls in STEM and improving retention.

National Career Pathways Network Conference

October 22, 2010

A STEM Equity Pipeline Workshop was conducted at the National Career Pathways Network Conference at the Sheraton Dallas Conference Center, Dallas, TX. The purpose of the workshop was to provide an overview of the Five Step Program Improvement Process. The session had 12 attendees, and 10 completed an evaluation survey. The participants included teachers, administrators, counselors and school staff.

Based on the survey results, most participants strongly agreed that they understood the purpose and goals of the STEM Equity Project (average rating 3.7). They also agreed that they are now familiar with the 5-Step Process, and that the case study that was presented as part of the workshop aided their understanding (average ratings 3.4 and 3.5, respectively). In addition, participants felt that the workshop raised their awareness of the value of quantitative data as a decision-making tool for program improvement and that the discussion of research-based root causes led them to want to know more (average ratings 3.4 and 3.3, respectively).

Webinars

The STEM Equity Pipeline Project sponsored three webinars that were conducted by experts in the field of STEM equity during Year 4. These sessions allowed attendees from across the U.S. to gain knowledge of current research on STEM equity and policy issues related to gender equity in STEM fields. Evaluation surveys were administered at the end of the webinars asking about participants' experiences, and average ratings for each event were at least 2.9 or higher. All of the surveys had three items with statements about the event in common (Table 3). On a

4-point scale (1=strongly disagree and 4=strongly agree), participants overall agreed that each Webinar was well-planned and organized (3.5), useful for worked related to gender equity (3.3), and that they did not have any logistical issues with connecting to the Webinar (3.2).
[See Findings Attachments for Table 3]
The following are summaries of each of the three webinar events:
Spark Talented Minority Girls' Interest in Engineering, Female Recruits Explore Engineering: The FREE Project
January 27, 2011
The first webinar had 112 participants from 11 states and was hosted by Monica Bruning, the director of the Outreach and Recruitment office for the College of Engineering at Iowa State University. This session presented the Female Recruits Explore Engineering (FREE) Project as a strategy to increase the number of girls in STEM. The session taught participants how to implement the project with an online tool-kit that included guidelines for reviewing data and research related to girls pursuing engineering careers. Most respondents agreed that they now have a good understanding of the FREE project as a strategy to increase the participation of girls in STEM courses and careers (average rating 3.1). They also learned about implementing the project (FREE) with an online tool kit (average rating 3.3). Overall, participants agreed that the session added to their understanding of data and research related to girls pursuing engineering careers (average rating 2.9).
Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets
February 16, 2011
The second webinar had 65 attendees from 8 states and was hosted by Fred Smyth, a faculty member in the Department of Psychology at the University of Virginia. The session acquainted participants with the theory of implicit mindsets, and how implicit mindsets impinge upon important, sometimes life-altering, judgments and decisions. The facilitators also addressed research linking implicit biases to critical STEM outcomes, as well as methods for measuring implicit bias in STEM. The Webinar included a demonstration of the Web-based Implicit Association Test.
Survey respondents agreed that this webinar made them aware of implicit mindsets in STEM, and the measurability and effects of implicit mindsets (average rating 3.4). They also agreed that they learned about research linking implicit biases to critical STEM outcomes (average rating 3.3). Further, respondents agreed that the session added to their understanding of ways to measure implicit bias in STEM, including the demonstration website for the Implicit Association Test, and taught them strategies for changing implicit biases and combating their negative effects (average ratings 3.4 and 3.2, respectively). Respondents believed that after participating in the session, they will adopt a mindset that 'nurture' has more of an effect than 'nature' on perceptions of STEM ability (average rating 3.2).
Cognitive Beliefs and Cultural Variables Matter in STEM Career Development
March 22, 2011
The final webinar had 109 participants from 17 states and was hosted by Angela Byars-Winston, a faculty member in the Department of Counseling Psychology at the University of Wisconsin?Madison. The Webinar focused on the relationship between cognitive beliefs and cultural values and academic and career commitment in science and engineering. The Webinar presented data from studies of underrepresented STEM populations at the undergraduate level and examples of strategies for improving gender equity in STEM.
Survey respondents agreed that they became aware of how social cognitive theory applies to STEM career development (average rating 3.5). They also learned about career development research that has focused on racial/ethnic minority undergraduates in STEM (average rating 3.6). Further, the session added to the respondents' understanding of ways to increase STEM career interests and commitment to research (average rating 3.3). Respondents agreed that after participating in the webinar, they will be able to adopt one or more of the strategies that were shared (average rating 3.2).
Archived Webinars
In addition to the new webinars presented during Year 4, the STEM Equity Website offers 21 archived webinars. Table 4 lists the 11 archived Webinars that had at least 5 viewers from August 2008 to June 2011, and the total number of viewers and viewers from states participating in the project for each (The STEM Equity Pipeline Project states are California, Georgia, Iowa, Illinois, Minnesota, Missouri, Ohio, Oklahoma, New Hampshire, Texas, and Wisconsin.). Webinars are archived soon after they are presented live, and therefore, Year 4 Webinars also had viewers and are included in the list. The remaining archived webinars had fewer than five viewers each. From August 2008 (when the first view was recorded) to June 30, 2011, the archived Webinars had a total of 359 views: 285 from states participating in the Pipeline Project, and 74 (20.6 percent) from other states.
[See Findings Attachments for Table 4]
The webinars with the most viewers, Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets and Pink Brain, Blue Brain? Females and Males in Math and Science had 162 and 115 viewers each, respectively. Overall, viewers of the archived webinars included students (59.2 percent), instructors (13.2 percent), administrators (5.3 percent), state agency staff (5.9 percent), and others including researchers, counselors, program coordinators, and business representatives (9.6 percent combined). The remaining 6.9 percent did not indicate their role.
Pilot Site Participant Background Surveys
During Year 4, the evaluation team and project staff developed a plan for using pre- and post-surveys in pilot sites to gauge the project's impact on participants' knowledge, understanding, and interest in STEM equity issues. As part of this effort, pilot site facilitators and participants in states that joined the project in Years 3 and 4 were asked to complete a background survey. The survey asked about participants' current knowledge of STEM equity issues and also asked whether they had received professional development on gender equity and/or participated in any programs designed to promote gender equity during the previous five years. The survey was administered during the first in-person 5-Step

training workshop offered by project staff in each site or state, and the results will serve as a baseline measurement. Pilot site participants will complete a post-survey after they have completed 2 years with the project, and the results of the two surveys will be compared to assess the effects of participation in the pilot project on their knowledge and awareness of issues related to equitable participation in STEM courses and careers and on their use of strategies to address the issues.

A total of 75 surveys were collected from pilot site participants in four states: Georgia (20), New Hampshire (17), Ohio (32), and Texas (6). The participants included teachers (14), administrators (29), and others (32), such as program coordinators, guidance counselors, and education consultations. Respondents were from a variety of institution types, including community colleges, elementary, middle and high schools, departments of education, and other community organizations.

Participants were also asked to rate their knowledge on a variety of topics with '1' meaning they are not familiar with the topic and '5' meaning they have high knowledge of the topic and could teach it to others. Topics for which participants reported high familiarity included teacher expectations, school climate, career development, cultural diversity and gender, and sexism, racism, bias, and stereotyping (average ratings for each of 3.4-3.5 out of 5). Overall, the facilitators had a slightly less than moderate level of knowledge of the research on women in STEM, strategies for increasing women in STEM, and where to find relevant resources (average ratings 2.5-2.7). They had less knowledge about the 5-Step Process (average rating 2.3). Only 12 participants rated themselves highly on any of these items (4 or higher). The participants were least familiar with attribution theory, micro-inequities, and spatial skills and visualization (average ratings 2.1-2.5 out of 5).

Using the same rating scale, participants were asked to rate their knowledge of various strategies, best practices, and models for promoting gender equity in STEM education. Participants were most knowledgeable of creating positive classroom climate, effective instructional practices, and creating a positive school environment (average rating of 3.5 for each). They reported less knowledge of conducting a nontraditional career fair and gender equity leadership for administrators (average ratings 2.1).

Lastly, participants were asked several questions about their training and professional background. Fifty-six percent of the respondents said that they had received some professional development training on the use of data for program or instructional improvement. The majority (71 percent) reported that they had used data in their work to identify performance gaps or to improve their programs. Less than half of the participants (40 percent) stated that they had received professional development training related to gender equity. Finally, 33 percent said that they had participated in a program designed to increase female participation in STEM or CTE courses and programs.

Extension Agent Surveys

The Extension Agent Survey is a web-based reporting tool accessed through the STEM Equity Pipeline Project Website. http://www.stemequitypipeline.org/StateTeams/ExtensionAgentReporting.aspx

The survey asks individuals that have participated in one or more project activities (extension agents) to report how they have shared the information they learned through the project with their colleagues at the state, district, and school levels; students, and community members. Periodic e-mail reminders to the STEM Equity listserv prompt extension agents who have attended 5-Step Process training or other professional development provided by the STEM Equity Pipeline project to complete the short survey. The survey requests some basic demographic information and then asks respondents to describe how they shared the information, whether through one-on-one sharing with colleagues or in more formal presentations at conferences and workshops. Respondents are also asked to describe the content of what they shared and how they learned it, the size and type of audience, any feedback they received, and to provide suggestions they might have for improving the training and information offered by the STEM Equity Pipeline Project.

The first completed extension agent surveys were submitted in March 2009. In response to participant feedback at the State Leadership Institute in April 2010, the survey was revised in Year 3. The revision made reporting on multiple events easier by allowing respondents to summarize information for all the events in a quarter (July-September, October-December, January-March, and April-June) in one survey, rather than having so submit a new survey for each event. The new survey also included a new question about the source of the information that the extension agent shared.

Summary of Extension Agent Reports for Years 2 through 4 (March 2009 through June 2011)

As an indication of the scope of extension agent activities since reporting began in March 2009, this section provides a summary of the number of individuals and states represented in the survey data. Extension agents have completed a total of 326 reports (Table 5). The new version of the extension agent survey created in Year 4 allows respondents to report multiple events in one survey, and, as a result, the number of surveys declined from 145 in Year 3 to 126 in Year 4. The number of extension agents submitting surveys, however, increased from 63 in Year 3 to 95 in Year 4. The number of reported events also increased, with 66 reported in Year 2, 146 in Year 3, and 247 in Year 4. The most commonly reported events were conferences/workshops (149) and one-on-one sharing with colleagues (138). The surveys indicate that an estimated 18,928 people have been reached through conferences, workshops, in-service trainings, meetings, and one-on-one sharing. Between Project Years 2 and 3, the reported number of people reached tripled (from 2,035 to 6,500) and increased by about 60 percent from Years 3 to 4 (from 6,500 to 10,393, respectively). Since the format of the survey changed over the course of the project, the numbers should be regarded as rough estimates but do indicate that the reach of activities has increased significantly. Also, it should be noted that these numbers likely underestimate the number of program participants sharing what they have learned, since the respondents complete the surveys voluntarily and on their own time.

[See Findings Attachments for Table 5]

Over three-quarters of the reports (about 83 percent) were submitted for events that occurred in the 11 states that are past and present project participants. The states that had the largest number of reported events (including one-on-one sharing) across the 3 years were Illinois (130) and Wisconsin (108). Reports were received from a total of eight non-participating states in Years 2 and 3 (Arkansas, Arizona, Colorado, Idaho,

Michigan, Pennsylvania, Vermont, and West Virginia) and 18 in Year 4 (Arkansas, Colorado, the District of Columbia, Indiana, Kansas, Maryland, Michigan, Montana, North Carolina, New York, Oregon, Pennsylvania, South Dakota, Tennessee, Virginia, Vermont, Washington, and Wyoming).

Year 4 Extension Agent Survey Result Details

Following on the Extension Agent Report summaries of previous Pipeline Project NSF reports, this section provides additional details about the surveys completed in Year 4. As in earlier years, Year 4 respondents were asked to choose an occupational category that best describes their position. Of the 66 extension agents who provided this information, a plurality was comprised of administrators (31), followed by state education agency staff members (7), teachers/instructors (7), and counselors/mentors (6). Other roles listed included business/industry representatives, outreach coordinators, and CTE specialists. The largest increase from the previous year was in the number of administrators submitting reports, which jumped from 11 in Year 3 to 31 in Year 4. The activities reported were one-on-one sharing (91), regional, state and national conferences/workshops (75), other meetings and presentations (49), and in-service training events (32). The 'other meetings and presentations' included items like recruitment presentations and career fairs. Respondents were also asked to indicate the type of audience for the reported activities, and respondents could choose more than one category. The most popular categories were teachers, administrators, counselors, students, scientists, and business/industry representatives, and most events included participants from several of these groups. Respondents were also asked to provide the name of the events in which they shared the information. Example of the types of conferences/workshops and in-service trainings are listed below:

Conference and workshops

? 2010 Illinois Project Lead the Way Counselor and Administrator Conference
? Forum for Excellence
? Marketing STEM to Girls, a conference sponsored by the WGCP and NAS

In-service training

? Ohio Perkins Coordinators' Spring Meeting
? Ask the Expert professional development series
? Nontraditional Pilot Exploratory Meeting

The new survey also asked participants to indicate how they learned the information they shared by choosing one or more information sources from a list. Some 110 of the 145 surveys included a response to this question, and most selected multiple sources of information (see table 6). [See Findings Attachment for Table 6]

The most frequently selected sources of information were a STEM Equity webinar (50 percent of respondents) and the STEM Equity Website (37 percent). Participants also shared information learned during a 5-Step training workshop conducted by STEM Equity Pipeline project staff (28 percent), STEM Equity Pipeline presentations at conferences and workshops (24 percent), state team meetings (23 percent), the NAPE Professional Development Institute (22 percent), and the Pipeline Press Newsletter (21 percent).

Activity Feedback and Suggestions for the STEM Equity Pipeline Project

Extension agent survey respondents were also asked to briefly describe the feedback they received from participants. A total of 88 surveys included participant feedback for the reported activities. The newer version of the survey allowed respondents to select from a list of options and provided space for respondents to write in additional feedback. The open-ended comments showed that the events reported by the extension agents were generally well received by the attendees. A few noted that some attendees wanted more concrete directions for their situation, and others didn't feel they had the time or resources for the program. The most frequently selected feedback items from the new survey are listed below:

? Greater awareness of STEM-equity issues (52)
? Greater awareness of root causes regarding gender equity in STEM (31)
? Greater awareness of data regarding gender equity in STEM (29)
? Follow-up inquiries requesting other materials or information (23)
? Greater awareness of the need for program evaluation (21)
? Additional meetings planned (14)
? Interest in implementing the 5-Step process (11)

Examples of additional activity feedback include:

? 'Better understanding on marketing of STEM to appeal to underrepresented groups.'
? 'Greater awareness for what is taking place at our local and school level.'
? 'I plan to work with teacher groups regarding nontraditional workshops.'
? 'Enthusiastic participation in the STEM Startling Statements activity.'
? 'I had the sense that they wanted to hear less about the project and more about how they could apply the resources.'
? 'There was excellent interaction during the workshop and very positive evaluations. Participants appreciated the resources offered.'
? 'The feedback was that we could not take on this project in light of the other projects and priorities at the college. We will re-visit this issue again next year.'

At the end of the survey, respondents were asked to provide suggestions for future professional development or curriculum development that would help them more effectively conduct their training. Forty-one of the surveys had responses to this question. The majority of the responses concerned suggestions for additional resources on specific topics. Several respondents suggested continuing the free resources such as

Webinars and newsletters. Several also suggested making events more interactive for attendees. Several respondents also commented on what they felt worked well. Selected examples are reproduced below:

? 'I would love more specific workshop topics for staff development in house and activities to bring awareness of gender issues.'
? 'Building regional partnerships to connect work with economic development efforts. Need a broader scope to ensure sustainability and institutionalization.'
? 'Add some more interactive activities.'
? 'Evaluation and assessment techniques for program improvement and student impact.
? 'Helpful Power Points and other resources that can be used to educate people. Such tools have been developed and provided. The presentation I did was a modification of such a Power Point.'
? 'I work in a State Dept of Education and find the topics presented to be of real value. However, I need to find the time to preview the presentations that are available in my free time. I am not always available when they are going live.'
? 'I would like specific activities that volunteers could do to work with groups of girls to encourage them to consider technology related careers.'
? 'Materials to share with teachers and parents and students. I've used 'Why so Few,' and that was very well received.'
? 'More accessible data on trends in women's employment, salary and demand for trained workers (outside of Startling Statements). Had to hunt for data from one of the NAPE National Conference sessions I attended.'
? 'More global awareness and international collaborations with countries in Central and Western Europe.'
? 'More practical experience and in-depth information on development of survey instruments, data collection, and data interpretation would be very helpful.
? 'Opportunities to learn more about/meet/network with other individuals who are interested in doing research. I just learned of the STEM Equity Pipeline, and I'm not sure if you already have something like this. I need to explore your website more. Some type of online way to meet would be great in these economic times when travel dollars are so limited.'
? 'The participants in the workshop asked several questions about resources around scholarships for female engineers.'
? 'We need information on how to help industry and business representatives become involved with the STEM Equity Pipeline's initiatives. Let's do more collaborative work with the employers.'
? 'The webinars are very good. I don't mind if there is some overlap between topics, or if one webinar reviews some of what was in another. I will keep trying to attend.'
? 'The information that we have received thus far has been very beneficial.'

Interviews with STEM Equity Pipeline Project Participants

To learn about the implementation process, activities, and accomplishments of states that had participated in the project, the evaluation team interviewed 20 pilot site (Sites that had implemented specific strategies at local level in an effort to increase impact of the project goal to effect changes in female participation in non-traditional coursework.) and state-level project participants from nine states. These interviews followed a previous set of interviews conducted with five states that had participated in the project for the first two years, and several of the interviewees participated in both rounds of interviews. The Year 4 interviewees were from California, Georgia, Iowa, Minnesota, Missouri, New Hampshire, Ohio, Texas, and Wisconsin. Interviews were conducted by telephone in May and June of 2011 using a semi-structured interview protocol. The final analysis was based on interviews with 20 participants, and included from one to four interviewees from each state.

Interviewees were asked to describe their teams' accomplishments and challenges, assess the project's services and materials, and describe their plans for the project during the next year. They were also asked to reflect on their team's success in meeting the project's goals and how their project work had changed their own awareness of STEM equity issues and approach to their work in education. Participants' answers were confidential, and only summary information was shared with the project team (information that might identify a state or individual was removed).

The interview notes were coded for themes and patterns, and the general themes that emerged were synthesized into a set of statement to inform project planning and development.

The following are the primary findings from the interviews regarding implementation and outcomes.

Implementation:

? Participants supported the pilot site approach and felt it to be an effective means of working with the 5-Step Process and building support for the project at their sites and within their states.
? Project services, including ongoing technical support and the 5-step training workshops, received high praise. Participants almost universally described the workshops as excellent and valuable.
? Several interviewees from sites that had been part of the project for more than two years noted that they could have used more support in following through over time. In particular, they requested strategies for revisiting the steps and evaluating the impact of their work after the chosen strategies are implemented.
? Depending on their role in the project, pilot site participants reported spending an estimated 24 to 120 hours on project activities during the past year. These hours were generally added to existing workloads or volunteered.
? Participation levels ranged from administrators who reported spending a few hours per month coordinating faculty member and other staffs' efforts, faculty members devoting an estimated 2-3 hours a week, to a gender equity coordinator who devoted one quarter to one third of a part-time position to project activities.
? Interviewees reported extensive use of the NAPE and STEM Equity Websites to find materials useful for the Pipeline project and their own

work. Most reported watching at least one Webinar. Use of SharePoint Websites varied by state and pilot site. Interviewees that reported using the SharePoint site described it as a place to store project materials, and only two reported using it to access materials from other sites. Several respondents expressed interest in a more interactive site that would encourage networking with others. All of the respondents indicated that they chiefly use e-mail for communications.

Outcomes, successes, and sustainability:

? Data work in connection with the Pipeline Project has led to the recognition of inaccurate data on nontraditional participation and completion rates in four states over the course of the project. In each of these states, project participants have taken steps to address the issue with data analysts at the state or local level and improve data quality.

? Project participants reported that the project had increased their awareness and understanding of STEM Equity issues, and as a result, had both changed and intensified their engagement with these issues in their work.

? Project participants in sites that had implemented at least steps 1 to 3 of the 5-Step Process noted increases in female participation and completion in STEM-related CTE courses and extracurricular events.

? Project-related activities?particularly at pilot sites?continued in the five states that joined the project in Years 1 and 2 and completed their two active years in the project. These sites reported continued engagement with the 5-Step Process and were appreciative of the ability to contact project staff for support as challenges arose.

Project Themes

The interviews also explored several themes that built on the themes that emerged out of the Year 3 interviews. Where relevant, the following analysis includes information from the Year 3 interviews to further elucidate the Year 4 findings for each theme described below:

Understanding and Using Data

In the Year 3 interviews, respondents noted that their engagement in the Pipeline Project had resulted in their working with their districts and institutions to develop a 'culture of data' and being more actively engaged in using data to understand and improve their programs. Participation in the NAPE STEM Equity Pipeline project also encouraged participants to be more critical about the data quality and the quality of the data reports they receive. Participants in three states also reported advocating for changes in the way the data are reported and used at both the state and local levels.

In Year 4, respondents also reported that the project increased their engagement with and use of data both to understand and improve their CTE programs. Participants in two states reported data improvements underway as part of the project activities. Another interviewee described a partnership between the state education agency and the Pipeline Project participants to provide professional development on the 5-Step Process to schools working to improve participants that is being developed.

Interviewees' statements about their experiences using data in the project included:

? 'This [project] was the first time we had looked at data like this. We were aware that we needed to improve female participation but did not have a plan for it. We are now following a cohort of 6th graders to see how they enroll in their classes in high school and eventually hope to see the impact of the activities in college.'

? 'Most unexpected for us in the project was what the data showed?you know it is bad, but don't know how bad it was. The attrition rate was much more substantial than retention.'

? 'In the 5-Step training, we used the demographic data here and also worked with the area high schools. We actually looked at our demographics, and that provided us with some insight. We had not done that before.'

? 'The most surprising thing we found was how the [secondary and postsecondary] data didn't correlate. How can we know if we are being successful if data systems don't talk to each other? We have all these projects going on. How do we know if they are successful?'

Commitment and Awareness to STEM Equity Issues

Participants reported increased awareness of and commitment to improving STEM Equity in their state for females and other special populations. They felt that their own awareness had grown, and often that of their colleagues as well:

? 'The project has given me a better awareness of STEM equity and what we need to do to get students and instructors to participate more and to get conversations started with earlier grades. We are now talking to the preschool.'

? 'The attitude here now is that we are looking for opportunities. When we first pursued the ? grant, we had no intention of doing nontraditional work. We incorporated nontraditional issues after the fact [as part of this project]. We have taken nontraditional issues and embedded them into our daily work?it's now part of our focus.'

? 'We now have a bigger awareness [of STEM equity] on our campus? we presented at a staff development workshop in April and had 35 people attend our session.'

? 'In the training of new faculty, the gender equity component?I used to do only one little session [on this topic], but now it is in all of the sessions, and I incorporate gender equity into all of the training of new faculty.'

? 'I run the tech education department, and I am now working with the staff on female enrollment and working to change the attitudes?not things I really truly thought of before. I now ask the faculty: What are you doing when a female walks into your classroom?'

? 'As an academic advisor, I now base my work on skills rather than the gender of the person. [The project] has made me more open and has made me want to learn about more careers such as engineering, and has helped me to listen more carefully to what my students are saying.'

Project Services and Resources

As in Year 3, the Year 4 respondents reported that they found the 5-Step training and Webinars provided through the project valuable for their project activities and for their work in general. The products and services provided through the project were generally deemed to be of high

quality. The following are characteristic of the interviewees' responses:
? 'The training was wonderful. The most useful was the root causes analysis, and that we could bring that back and be able to use it with our faculty and staff.'
? 'The training was excellent?one of the reasons we really like this project, and the design of it. All of us like to do the research, and [the project] is research based. Allows us to go to our superiors and say here are the numbers, [and they] can't argue with them.'
? 'The root causes document is phenomenal because we would spend a whole meeting discussing that? it would keep us from going too fast without analyzing the data.'
In both the third and fourth year interviews, most interviewees acknowledge that the process requires substantial involvement and time to build capacity for implementing it. In the third year interviews, some participants felt overwhelmed by the 5-Step Process and particularly by the work with data presented at the beginning of the training. In contrast, fewer respondents in Year 4 reported that they found the 5-Step Program Improvement Process complicated or intimidating. They generally reported that they had a good understanding of the steps and work involved, but several felt the information was presented too quickly. Several pilot site participants also felt a year to be inadequate to cover all of the steps. However, it should be noted that different individuals were interviewed in Years 3 and 4 and although the different responses might reflect Project changes, they might also be attributable to differences in the types of people interviewed. For example, Year 4 interviewees may have been relatively more experienced or comfortable with data than their Year 3 counterparts.
Partnerships
In both the Year 3 and Year 4 interviews, interviewees reported that their organization's work with the Pipeline Project had resulted in new partnerships between state agencies, non-governmental organizations, and individual participants. Respondents also reported new or deeper collaboration with elementary, middle, and high schools for CTE centers, high schools, and postsecondary institutions.
Specific partners reported by pilot site participants included the Girl Scouts, 4-H leaders, chambers of commerce, local manufacturers and other industries, Project Lead the Way, YWCA, and the Society of Women Engineers.
Successes
The respondents in the Year 3 interviews generally felt that two years was too short to see a difference in the number of females participating in STEM programs as a result of strategies introduced through the NAPE Pipeline Project. This observation was echoed by the states that had recently joined the project in the Year 4 interviews as well: most were either choosing strategies or preparing to implement them.
Despite this concern about the time frame, several respondents from sites that are just beginning to choose and implement strategies offered examples of the types of implementation strategies and CTE program changes that are developing:
? '[One] department has changed its student recruiting efforts ? they are doing activities with younger students, taking activities out to the schools and showing students what they can do, rather than just handing out brochures to high school seniors.'
? 'We are getting people on the same page with regards to data. Secondary schools collect data differently than postsecondary, and we have been figuring out ways to correlate the two so that we can track students and find out what happens to them.'
? 'We have achieved buy-in from the secondary state education agency and are currently establishing a partnership with them to provide professional development in the 5-Step Process, and schools are expressing interest in participating.'
A number of sites that had implemented strategies reported changes in female participation in STEM courses and activities:
? 'When we started [the project], we had zero females in engineering?and we were lucky if we had one?and now we have a design technology class in which 3 of the 7 students are female. We have had a great rise in the number of females taking engineering-related courses. One of the girls in drafting in the engineering department participated in the summer program [that was started through our Pipeline Project work], and changed her schedule to be part of the class.'
? 'We have had nontraditional welding graduates: a young lady just walked across the stage that we didn't think was going to make it and we are seeing more nontraditional students completing? retention is also up.'
? 'I think we are at steps 3 and 4: we have increased awareness, and drafting has three more female students enrolling this year than last year.'
? 'We just had the first female ever apply for the manufacturing program.'
? '[One of our feeder high schools had a] STEM-related summer camp in which the number of girls increased as a result of asking the girls personally to participate.'
Project Sustainability
Several of the Year 4 interviewees were from five states that had been part of the project since Years 1 and 2. Although they acknowledged that sustaining project efforts had been challenging, given the difficult economic times and budget cuts, all of the interviewees reported continued project-related activities, particularly connected with pilot sites. Project-related activities included meetings of project participants, analyzing data, implementing strategies, and evaluating the 5-Step work already completed. The interviewees noted that continuing support from the project staff had helped to maintain momentum and sustain project efforts.
Interviewee statements about how the Pipeline Project will continue in their state or site included:
? One state-level participant who described a two-part partnership that the state Pipeline Project team is developing with a state education agency: 1) Schools will be required to use the 5-Step Process to examine data as part of their Perkins application. 2) The project will provide 5-Step training to schools not meeting their negotiated Perkins performance levels for nontraditional participation and completion.
? 'There is growing interest in the project from across our region?we have a 10 county area?and several school districts have asked how to get involved. More people across campus also wish to become involved, and it is time to reevaluate and go through the process again.'
Quantitative Data Collection and Analysis

In Year 4, the evaluation team continued to gather quantitative data for use in 5-Step Process training and to analyze program outcomes. In the first three years of the project, the research team sought data on the number of participants and completers (or concentrators, depending on data availability) in STEM-related CTE programs statewide. Except where noted, participants and concentrators are defined in accordance with the non-regulatory guidance on students definitions issued by the Office of Vocational and Adult Education in 2007 (see http://www2.ed.gov/about/offices/list/ovae/pi/memoperkinsiv.html). Completer definitions vary by state and where available, definitions are included in the text.Since the project's focus on working with pilot sites has intensified, data collection has focused on collecting data on programs in districts and postsecondary institutions participating in the pilot site work. The data analysis included in this report reflects the data collected on pilot site programs.

In Year four, the project team worked to collect data from 9 of the 11 project states. In several states, these data are available online (Georgia, Texas postsecondary level, and Wisconsin), and in two other states, at least some of the data were provided by state-level data analysts (Missouri and New Hampshire). In the remaining states, data privacy restrictions did not allow statewide data to be shared online or through state offices. For these states, project facilitators and the evaluation team worked with the pilot site leads to collect data directly from the participating school districts and postsecondary institutions (Iowa, Minnesota, Missouri, Ohio, and Texas secondary data) or partner projects (New Look in Illinois). The number of pilot sites for which data were available, as well as the populations (participants, completers/concentrators) and years for which data available varied from site to site.

[See Findings Attachment for Table 7]

The data analysis does not include California or Minnesota. In California, statewide data are available, but the state team's system-wide approach to 5-Step Process training left them unable to identify specific sites for which outcomes could be investigated. Training has occurred at numerous sites across the state, but few of the participating districts and community colleges have had adequate follow-up training to fully implement the 5-Step Process. The team has plans to establish closer partnerships with a small number of school districts though their new partnership with the California Department of Education in the coming year. Once these sites are established, data from the participating districts will be gathered and outcomes investigated over time. In Minnesota, privacy concerns prevented the sharing of data at the state level, and the Pipeline Project team is still working to collect multi-year data from the districts participating in pilot site work for the final report in the coming year.

The analysis of multi-year data reveals several programs with increases in the number of females participating and concentrating/completing at districts and postsecondary schools participating in pilot sites. For example, the available pilot site data from Missouri indicates that one site, Brookfield Career academy, has had growth in the number of females participating in Agriculture. About 9 percent of students in this program were women in 2005-06 and 33 percent in 2011-11, and the number of women increased from 4 to 20. Similar gains were seen at Sheboygan school district in Wisconsin, where the number of females participating in Vehicle and Mobile Equipment Mechanics and Repairers grew from 7, or 12 percent, in 2005-06 to 21, or 36 percent in 2008-09 (the most recent year of data available).

In the majority of programs analyzed, the number of females both increased and decreased over time, and the volatility in the number (and percentage) of female participants and completers made trend detection difficult. The number and percentage of females in many of the individual programs, and overall among the programs for which multi-year data were available, varied?and sometimes widely?from year to year. Several factors related to the programs and available data make it difficult to detect and interpret changes over time:

? Program enrollments are volatile: Multi-year baseline data (for example, see data for Georgia in table 8) indicate that female participation rates varied widely before the sites joined the project, and the volatility in numbers is likely to continue due to factors unrelated to project activities.

? Data availability can be limited: The data needed to assess outcomes over time is unavailable or only partially available in a number of the sites. Data at some sites and programs, such as Iowa Western Community College, is only available for the years since the college joined the project and does not include baseline data.

Moreover, the multi-year data analysis conducted in Year 4 revealed a number of limitations in the program-level data collected at both the local and state levels. These limitations, which may undermine data quality and complicate the analysis of programs outcomes, include:

? Inconsistencies or changes in data collection: In several states, program identification varied, in terms of both program titles and the assignment of 6-digit CIP codes from year to year, within states, and sometimes even within the same district institution. These differences make it difficult to follow program enrollments over time.

? Changes in data systems: Over the course of the project, several states have changed the ways they collect data, and these changes have limited multi-year comparisons in these states. Changes may also undermine short-term data quality as the changes are integrated into the existing system and analysts learn the new practices.

? Discrepancies between state-level and pilot site data: District- and institution-level project participants have noted that the data on nontraditional participation in their CTE programs does not match what they see and know about their own programs. In some cases, the cause was the improper calculation on nontraditional participation rates at the state level, or incorrect coding of data submitted by the state. In several states, the state has implemented, or is in the process of implementing, changes to the data system to improve data consistency and quality.

Given the limitations of the program-level data as a means for assessing project outcomes, the project staff and evaluation team have combined a number of strategies for assessing program outcomes. These include the pre- and post-pilot site participation surveys instituted in Year 4 and interview questions asking program participants about program outcomes at their sites. The participant interviews provided a number of insights regarding the evaluation of program outcomes, including the interpretation of quantitative data, for the Pipeline Project.

? The 5-Step Process takes time: Interview data indicates that although 5-Step Process implementation moves more quickly in the pilot sites than the state level, two years are generally needed to identify root causes and then choose and implement strategies. These strategies may then

require additional time to be fully implemented and to meet expectations regarding changes in participation rates.
? Strategies vary in effectiveness: The 5-Step Process is exploratory and iterative, and the first strategies chosen by a site may not be effective for increasing female involvement in STEM-related programs. The teams then reassess their efforts and try different strategies that may be more successful in the second round.
? Available data may not reflect program goals: Most of the data that states and sites have been able to provide has been on participants. Some sites, however, are focusing on retaining females who enroll, or else also have retention as one of their goals. Data on completers is available in some sites and could assist in analyzing changes in retention rates, but ideally assessing retention would be done with longitudinal data that tracks female and male students over time.
The above points caution against an over-reliance on quantitative data alone and indicate that program outcomes will best be tracked using a multi-pronged approach, that includes a number of data collection strategies. Moreover, work with the pilot sites has suggested potential new sources of quantitative data, including enrollment information for gateway courses, completion rates of math remedial courses at the postsecondary level, and data tracking individual students, that may provide more comprehensive outcome information in the coming years.
The following section outlines the quantitative data collected from each site, and the results of the data analysis.
Georgia
Georgia joined the project in Year 4, and baseline data has been gathered from all of the postsecondary pilot sites participating in the project for the years 2007-08 (participants) and 2008-09 and 2009-10 (participants and completers). Data from these sites is available for all of the STEM-related CTE programs associated with occupations nontraditional for females that the institutions offer; table 8 presents programs for which multi-year data were available. Since the project is new and the sites' strategies have not been implemented yet, these data will be compared with data for the coming years to explore program impacts on female participation and completion rates.
[See Findings Attachment for Table 8]
The percentage of female participants and completers in the programs that are the focus of the pilot sites' work are generally 20 percent or below, depending on the year. For example, at Augusta Tech, which is focusing on engineering programs, the number of female participants in Electronics-Computer Engineering Technology ranged from 9 (14 percent) in 2007-08 to 12 (20 percent) in 2008-09, to 9 again (11 percent) in 2009-10. Heart of Georgia Tech is concentrating its Pipeline work on Electronics and Telecommunications. From 12 to 21 women participated in this program in the three years of data available, representing from 7 to 12 percent of all participants.
Illinois
Because of data privacy concerns, statewide program-level data on female enrollments in CTE programs by district and postsecondary institution are not available in Illinois. The project has worked closely with the New Look project in the state, and efforts to increase the number of females in STEM-related CTE programs are underway at a number of New Look sites. The New Look team identified three community colleges?Black Hawk College, Sauk Valley Community College, and Southwestern Community College?as pilot sites, and these sites' final New Look reports are the source of the data reported here. The evaluation team reviewed a total of 12 annual reports from 2005-06 to 2010-11 were retrieved June 20, 2011 from http://icsps.illinoisstate.edu/newlook/showcase/index.html. Not all sites have reports in each year. The project teams at these institutions have been trained in the 5-Step Process and are using the process to select, implement, and evaluate strategies to increase the number of females in nontraditional occupations, and the data presented here are drawn from the final reports submitted by the sites from 2005-06 through 2010-11.
The information included in the annual reports has some limitations. Each project identifies some long-term goals (generally 5 years, but sometimes shorter) for the percentage of students enrolled in programs nontraditional for their gender. Unfortunately, the final report template requests participants to report only on the preceding year's outcomes, and the results generally do not include data on progress towards long-term goals. In the coming year, the evaluation team will follow up with all three sites for updates and to request additional information.
In 2005-06, the 'Focus on Nontraditional Careers Program' at Southwestern Community College set an initial long-term goal to increase the number of students enrolled in nontraditional programs with respect to gender. The 2005-06, 2006-07, 2007-08 annual reports include descriptions of activities including workshops on nontraditional careers and mentoring programs for high school and college students. Evaluation data included in the reports indicate that participants left the sessions with greater knowledge of and interest in careers that are nontraditional for their gender.
In 2009-10, Sauk Valley Community College completed the 5th year of a project entitled 'Women in Engineering.' In each of the five years, this project has offered a 'Women in Engineering Day' that provides information on engineering careers to high school girls that includes speakers, and provides marketing materials on engineering careers aimed at females. Some 23 girls participated in the day in 2007, 12 in 2008, 35 in 2009, and 21 in 2010, and the event evaluations consistently indicated that the experience was reviewed favorably by participants. The project has a long-term goal to increase the number of females in Sauk's engineering program, but the reports do not address the status of that goal.
Iowa
Iowa joined the project in Year 2 and provided baseline data on participant and concentrator data for 2006-07 and 2007-08. Unfortunately, restrictions on data sharing due to privacy concerns prevented the state agencies from sharing the same data for subsequent years. During Year 4, the state facilitator contacted three of the four primary pilot sites to collect information on females in their CTE programs. Indian Hills Community College was not contacted because they are primarily working with younger (middle school or earlier) students.
Data were submitted by Hawkeye Community College and Iowa Western Community College. The data request with Kirkwood Community College is pending. Hawkeye Community College submitted data on the numbers of degrees awarded by gender in various fields, and the

evaluation team is currently working with the college to collect data for multiple years and to identify the fields that are nontraditional for women. Iowa Western Community College submitted 2007-08, 2008-09, and 2009-10 fall enrollment information for classes in the program that the college is focusing on: computer science. Table 9 includes the courses for which multi-year data were available.
[See Findings Attachment for Table 9].
Overall, about 40 percent of students in these classes are female in each of the three years. The classes with the highest numbers and percentages of females are Introduction to Computers (about 48 percent) and Computer Webpage Design Software (from 36 to 51 percent). Over the years analyzed, the number and percentage of females in two of three of classes that started out with fewer than 25 percent females enrolled increased. Females accounted for 11 percent of enrollments in CCNA Exploration 1 in 2007-08, and 21 percent in 2009-1, and the number grew from 3 to 7. A similar change was seen for LINUX Network Administration. The number of females enrolled in PC Support 1, jumped from 9 to 19 percent between the first and second years but fell to 12 percent in 2009-10.
Missouri
Missouri has been part of the project since the first year and has provided statewide data for both evaluation and training purposes. In working with the data for nontraditional students both for this project and for other activities, members of the project team and their colleagues discovered that nontraditional students were not being accurately flagged in the CTE data system. As a result, the statewide data underestimated the number of nontraditional students enrolling in STEM-related courses in other programs. A correction to the data collection system has been instituted, and the data should more accurately reflect enrollment numbers in the coming years. Until several years of the corrected data are available, project participants are using data from their own sites for training and to analyze outcomes and sharing these data with the evaluation team as well. Data availability is limited; data are not available for all of the sites, and the years and types of data available vary among the sites for which data are available.
Table 10 presents data on secondary students at two Missouri pilot sites for which multi-year data are available: Brookfield Career Academy (total and female completers from 2005-06 through 2010-11) and Crowder College Technical Education Center (total and female fall enrollments from 2007-08 through 2009-10).
[See Findings Attachment for Table 10]
The results indicate that the two sites experienced modest but steady increases in the number of females completing and enrolling in STEM-related CTE programs over the years analyzed. At Brookfield Career Academy, the percentage of females among completers of STEM-related CTE programs grew from about 9 percent in 2006-06 to about 15 percent in 2010-11. Much of the change was driven by the program with the largest gain, Agriculture; about 9 percent of completers in this program were female in 2005-06, and about 33 percent in 2010-11. The numbers of females enrolling in any of the STEM-related CTE programs at Crowder College are small (none of the programs enrolled over 3 in any of the years analyzed), but increased to 9 in 2009-10, up from 6 and 4 in 2007-08 and 2008-09, respectively.
New Hampshire
New Hampshire state data analysts provide statewide data on secondary enrollments and completers for 2007-08, 2008-09, and 2009-10, and on postsecondary participants and concentrators for 2007-08 and 2009-10 (data for 2008-09 was not available). In New Hampshire, a secondary completer is defined as A CTE completer at the secondary level is a student who has completed 90 percent of the approved program competencies with a score of 3 (proficient) or better. The secondary data presented here are for the Milford High School and Applied Technology Center pilot site, and the postsecondary data are for the White Mountain Community College pilot site. New Hampshire has one additional secondary pilot site at Sugar River Valley Technical Center in Claremont, NH. The project anticipates obtaining data for this site in the next few months.
[See Findings Attachment for Table 11]
The number and percentage of females in STEM-related CTE programs at Milford vary by year and program. The only trends found are for Biotechnology (the number and percentage of females among participants and completers increased from 2007-08 to 2009-10) and for Graphic and Printing Equipment (the number and percentage of females among participants and completers decreased from 2007-08 to 2009-10). Although the percentage of completers in Engineering Technology that were female grew from 2007-08 to 2009-10, the change was driven by a decrease in the number of male completers.
Ohio
Ohio joined the project in Year 3. Data privacy restrictions prevent the collection of data from state-level sources, and efforts are currently underway to collect baseline and outcome data on female participants and completers in STEM-related CTE programs from the three pilot sites. The project has successfully collected three years of baseline and outcome data on female participation rates from Cincinnati State Technical and Community College.
[See Findings Attachment for Table 12]
Data on participants in STEM-related CTE programs at Cincinnati State Technical and Community College indicate that about 11-12 percent of participants were female in 2007-08, 2009-10, and 2010-11. None of the programs shown experienced steady increases in the number and percentage of female participants across all three years, but the number of females in Landscaping and Groundskeeping went from 25 in 2007-08 to 31 in 2010-11, and the number in Computer Engineering Technology from 24 in 2009-10 (9 percent) to 40 in 2010-11 (12 percent). More years of data will be needed to determine if these changes represent multi-year trends.
Texas
Texas joined the Project in Year 4 and has pilot sites based at four technical and community colleges. The evaluation team has compiled baseline data for 2007-08, 2008-09, and 2009-10 on female and total student enrollments in the STEM-related CTE programs that are the focus

of the pilot sites' activities at all of the colleges except Clarendon. Clarendon is working with a program that is new in 2010-11, Wind Energy, and baseline data will therefore be collected during the current year and analyzed in Year 5.
[See Findings Attachment for Table 13]
The percentages of females enrolled in the target programs range from 3.1 percent in Vehicle Maintenance and Repair Technologies at Texas State Technical College (TSTC)?Waco to 22.9 percent in Drafting programs at Alvin Community College. The Texas Higher Education Coordinating Board also provides statewide numbers and averages for benchmarking NTO enrollment progress; the programs targeted by the pilot sites are below the state averages in each year, with the exception of Drafting at Alvin Community College. Female enrollments in this program were slightly above the state average (by about 1 percentage point) in 2008-09 and 2009-10.
The colleges are also planning to partner with local secondary school programs and work together to devise strategies designed to increase female enrollments in the target programs. The state facilitator will be working with the secondary sites to determine the best way to collect data on their programs in the coming year.
Wisconsin
The pilot site at Lakeshore Technical College in Wisconsin has worked with three local school districts, Manitowoc, Plymouth, and Sheboygan, to work through the 5-Step Process and participate in Pipeline Project activities. The activities focused on increasing female enrollment in STEM-related CTE programs, and specific events targeted recruitment for engineering classes and welding programs, among others. Karen Showers, Judy Stanton, Patti Saunders, and Kari Krull, 'Nontraditional Occupations and STEM: Exploring the interrelationship, with examples of supportive strategies,' presentation at the STEM Equity Pipeline Project Leadership Institute, Crystal City, VA, April 12, 2011.
Secondary program enrollment data by gender at the three districts was available for selected programs from 2005-06 to 2008-09, and the analysis presented in table 14 includes programs for which multi-year data were available. Data for the number of female enrollees and graduates were available for an additional year from Lakeshore Technical College, and the evaluation team compiled college data for 2005-06 through 2009-10. The analyses of these data included programs with at least 10 enrollees in 2010 and for which at least 3 years of data were available.
Although pilot site participants reported increases in the interest and awareness among girls in STEM careers in their onsite surveys and event evaluations, as well as upticks in the number of girls taking engineering and other classes, and these differences have not yet been reflected in the STEM-related CTE program level data. The changes reported by the participants are small and include involvement in gateway courses and co-curricular activities, for which data are not available.
[See Findings Attachment for Table 14]
At the secondary level, overall female enrollments varied across the districts and from year to year. In terms of numbers of females enrolled overall, only Sheboygan had a consistent increase across the years, and the number of females participating in the programs analyzed went from 52 in 2006-06 to 66 in 2008-09. The corresponding percentages rose from 19 to 31 percent over the same time period. In terms of programs, much of the increase is attributable to Vehicle and Mobile Equipment Mechanics repair (11.9 and 36.2 percent in 2005-06 and 2008-09, respectively) and Precision Metal Workers (0 and 26.2 percent in 2005-06 and 2009-10, respectively).
[See Findings Attachment for Table 15]
At the postsecondary level, the number and percentage of female students enrolled in the programs analyzed varied from year to year and only IT-Computer Support Specialist program showed a steady increase over all five years, from 6 female students in 2005-06 to 18 in 2009-10. However, since overall enrollments in the program grew as well, the percentage change was just one point, from 26 to 27 percent.

Training and Development:
STEM Equity Pipeline
Year Four Annual Report? July 1, 2010 ? June 30, 2011
Opportunities for Training

The STEM Equity Pipeline project has not wavered from its original implementation design and continues to work with teams of staff development professionals in states to act as extension agents within their particular professional development delivery systems. In many of the states due to the local control of professional development this work has been with teams located at community colleges, high schools and middle schools. Cross institutional teams continue to been trained in the Five Step Program Improvement Process, a data driven decision making process that assists teams in identifying effective implementation strategies to increase the participation and completion of females in STEM related programs of study. National professional development opportunities are facilitated through both webinar and in person formats where staff present at national and state level STEM and equity related conferences. Training opportunities for 2010-11 included:

EXTENSION SERVICES GROUP

In 2010-11 twelve experts (Lise Eliot, Ph.D, Monica Bruning, Paul Gorski, Angela Byars-Winston, Fred Smyth, Mimi Lufkin, Claudia Morrell, Courtney Reed-Jenkins, Howard Glasser, Katherine Weber, Winifred Walker, and Susie Wheeler were used to conduct webinars, present workshops at the professional development institute, or present at participating state professional development events. These individuals are named in the Participants: 'Who has worked on this project?' section of this annual report. States have relied on their State

Facilitator or the PI to conduct professional development and using experts to supplement when content specific training is requested.

The project staff met in Philadelphia, Pennsylvania, July 9-12, 2010. The staff meeting agenda is included in the attachments to this report. State Facilitators are their assigned states are: Mimi Lufkin, California, Missouri, Oklahoma, and New Hampshire; Freda Walker, Illinois and Missouri; Howard Glasser, Wisconsin and Minnesota; Courtney Reed Jenkins, Iowa; Randy Dean, Georgia and Susie Wheeler, Texas. In addition to the state facilitators the project evaluator Sandra Staklis from MPR, Inc. attended. The three days were spent reviewing the first, second and third year states progress, increasing skills in presenting the Five Step Program Improvement Process, evaluating the third year's activities and reviewing the evaluation plan for the pilot sites.

All members of the project staff met at the NAPE Professional Development Institute and STEM Equity Pipeline Leadership Institute in Washington, DC April 11-14, 2011. Each State Facilitator met with their state teams and participated in professional development training.

The management team consisting of the PI, the five state facilitators, two support staff located in the national office, the VLC manager and the two project evaluators met approximately once a month via conference call. These virtual meetings were very valuable in identifying areas of needed support, troubleshooting, and communication. The management team meetings were held on August 17, 2010, September 10, 2010, October 4, 2010, November 15, 2010, December 21, 2010, January 25, 2011, February 18, 2011, March 22, 2011, and June 2, 2011. The PI also conducted individual assistance calls with each of the state facilitators on an as needed basis. The PI also attended state team meetings and assisted the state facilitator in conducting training.

QUARTERLY STATE LEADERSHIP MEETINGS

In 2010-11, the STEM Equity Pipeline project implemented a new strategy to facilitate cross state collaboration and sharing. Quarterly conference calls/webinars were held with representatives of each of the state leadership teams. These calls were held on July 20, 2010, October 19, 2010, and January 18, 2011 for approximately one and one half hours each. The feedback from these calls has been very positive and many good ideas have been shared. These calls have also provided a mechanism for new states to learn from those states that have been involved in the project longer.

GEORGIA

The four pilot sites met on November 16, 2010 and participated in training on Steps 1 and 2 of the Five Step Program Improvement Process. Each team conducted a performance gap analysis of their selected program(s) and created an action plan for conducting their root cause research. Representatives from each of the pilot sites participated in monthly technical assistance meetings conducted online or as conference calls. These were held on December 15, 2011, January 19, 2011, February 16, 2011, March 16, 2011, April 20, 2011 and June 28, 2011. On May 10, 2011 the pilot sites met at Heart of Georgia Technical College for an all day onsite technical assistance meeting. The State Facilitator worked with the pilot site teams on their specific needs, including reviewing the five step program improvement process, learning about marketing and surveys, and designing recruitment materials for the state

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 10 participants from Georgia attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? June 30, 2011. Georgia had 13 people participate in these webinars.

TEXAS

Representatives from four pilot sites met at the Texas Association for Career and Technical Education conference in Austin, Texas on October 4-5, 2010. All of the pilot sites had participated in the Five Step Program Improvement Process training the year before so this training session was a review of the process and included a focus on Steps 4 (Evaluation) and 5 (Implementation). Each of the teams started on their implementation plans and set deadlines for each of the phases of the process. Representatives from each of the pilot sites participated in technical assistance conference calls on November 10, 2010 and January 6, 2011. In addition the State Facilitator conducted an onsite visit to Texas State Technical College in Waco, TX to work with the college's gender equity team.

In addition to pilot site support much effort was made this year to conduct outreach across the state about the projects resources. The following outreach activities were conducted by the State Facilitator
September 25, 2010 ? Attended the STEM conference at West Texas A&M University and networked with math and science faculty and other statewide STEM organizations.

November 17, 2010 ? Presented at the Texas Higher Education Coordinating Board meeting to inform them of the STEM Equity Pipeline project.
January 21, 2011 ? Presented at the Texas STEM Center Coalition Conference in Austin.
April 7, 2011 ? Presented at the Texas Association for Career and Technical Education conference with representatives from two of the pilot sites.
April 15, 2011 ? Presented at the Texas Higher Education Coordinating Board meeting to inform them of the progress of the pilot sites and the resources available to all schools in Texas.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 4 participants from Texas attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Texas had 32 people participate in these webinars.

NEW HAMPSHIRE

The pilot sites received training on Steps 1 and 2 of the Five Step Program Improvement Process on September 21, 2010 at Granite State College in Concord, NH. Teams from Milford High School and Sugar River Valley Regional Technical Center and faculty from 2 New Hampshire Community Colleges attended the training. On September 22, 2010, 16 professional development providers attended a special training on strategies for integrating gender equity into STEM teacher professional development. Follow-up training with the pilot sites on Steps 3, 4 and 5 of the Five Step Program Improvement Process was conducted on February 23, 2011 at the Plymouth Graduate Center in Concord, NH. 13 attended representing pilot site teams from Milford High School and Sugar River Valley Regional Technical Center as well as other members of the State Team and community attended.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 7 participants from New Hampshire attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports).

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. New Hampshire had 1 person participate in these webinars.

OHIO

The pilot site team from Washington State Community College participated in Five Step Program Improvement Process training at their campus on October 15, 2010 and May 6, 2011. Pilot site teams from Cincinnati State Technical and Community College and Sinclair Community College participated in the Five Step Program Improvement Process training on October 25, 2010 and April 8, 2011.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 8 participants from Ohio attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports).

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Ohio had 13 people participate in these webinars.

IOWA

Training with 10 of the 15 Iowa Community Colleges was conducted on July 6, 2010 and August 5, 2010 as part of their preparation for the Iowa Department of Education's Perkins Grants of $9000/college to increase the participation and completion of students in nontraditional CTE programs including women in STEM related programs of study. With the completion of this training 14 of the 15 community colleges in Iowa had participated in the Five Step Program Improvement Process training. In addition, Eastern Iowa Community College contracted with the NAPE Education Foundation to provide additional training and support beyond the scope of this project. The $135,000 investment by the Iowa Department of Education and the potential for contracting with local community colleges to continue providing support for their work is evidence of sustainability of the project in Iowa.

The Leadership Team held technical assistance calls with the State Facilitator on July 8, 2011, January 28, 2011, April 6, 2011 and May 16, 2011.

On March 2, 2011, the STEM Equity Pipeline Project supported a keynote presentation for sixteen Project Lead the Way faculty during a Program of Study meeting of the Kirkwood Community College Region. Professor Monica Bruning presented on her work to recruit African

American girls into engineering and, generally, on recruitment strategies for women in STEM.

On April 22, 2011, Courtney Reed Jenkins, State Facilitator for Iowa, presented at the Diversity in STEM Conference in Des Moines, IA. A first for Iowa, this conference was sponsored by the Iowa Department of Education in partnership with the Community Colleges of Iowa and Iowa Regent Universities. The goal of the conference was to create a forum for an exchange of ideas, promising practices, and proven strategies to address the low representation of diverse students in STEM fields in Iowa's secondary and postsecondary programs.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 11 participants from Iowa attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports).

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Iowa had 13 people participate in these webinars.

MINNESOTA

The pilot sites included: Hennepin West (North Hennepin Community College, Hopkins, Wayzata, and Eden Prairie schools), with a focus on engineering; Mid-Minnesota (Ridgewater College, Hutchinson and Gibbon-Fairfax-Winthrop schools), with a focus on engineering and drafting; Southwest Metro (Normandale College, Kennedy and Jefferson schools), with a focus on engineering and manufacturing; St. Paul (St. Paul College, St. Paul Public Schools), with a focus on computer programming, construction, and engineering. After successful strategy implementation in year two, each of these sites was asked to mentor four additional pilot sites with continuing financial support from MNSCU. The St. Paul consortium worked with the Itasca consortium; Hennepin West worked with the Great River consortium, Mid-Minnesota worked with the South Central consortium, and Southwest Metro worked with the Minneapolis consortium. Six webinars were held with these consortia sponsored by MNSCU and conducted by the State Contact. The State Facilitator participated in four of these webinars on September 20, 2010, December 7, 2010, January 4, 2011 and February 1, 2011.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 6 participant's from Minnesota attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports).

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Minnesota had 23 people participate in these webinars.

CALIFORNIA

On December 1, 2010, Mimi Lufkin attended the JSPAC annual conference and conducted a workshop on the STEM Equity Pipeline project and the program improvement process the project is employing with pilot sites.

The JSPAC meets quarterly and the State Facilitator participates in these meetings remotely to update the committee about national activities related to the STEM Equity Pipeline and to provide any assistance as activities are planned.

The California JSPAC conducted a series of regional meetings across the state and incorporated the training received from the STEM Equity Pipeline Project into these trainings. The State Facilitator provided technical assistance to the two extension agents conducting the training.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 7 participants from California attended representing the state leadership team. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. California had 26 people participate in these webinars.

ILLINOIS

The following pilot sites received training, technical assistance and mini-grant support from ICSPS's NEW Look project in 2010-11: Bement High School, College of DuPage, Danville Area Community College, Lincoln Land Community College, Sauk Valley Community College, Wilbur Wright Community College, Elgin Community College, Olney Central College Learning Center, John Wood Community College, Kaskaskia College, Kishwaukee College, Southwestern Illinois College.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 5 participants from Illinois attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute

participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Illinois had 14 people participate in these webinars.

MISSOURI

Six of the CEC's are continuing to work with pilot sites within their region to implement the strategies they have identified by completing the Five Step Program Improvement Process. The State Facilitator provided training and technical assistance to the CECs as they implemented the training and assisted them in accessing experts from the Extension Services Group as their needs become apparent. The pilot sites are: Excelsior Springs Career Center, Brookfield Career Center, Columbia Career Center, Linn State Technical College, Current River Career Center, Ozarks Community College, Arcadia Valley Career Technology Center, Clinton Technical College, Perryville Career Center and Crowder College.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 4 participants from Missouri attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011. Missouri had 2 people participate in these webinars.

OKLAHOMA

The Career Technical Education Equity Council annual conference is held each year in Tulsa, Oklahoma. Although this conference is a national conference a majority of the participants are from Oklahoma. Each year the STEM Equity Pipeline has sponsored a strand of workshops as part of the conference agenda. The conference was held September 16 and 17, 2010 and the following workshops were conducted:
STEM: Increasing the Pipeline for Students in Nontraditional Careers presented by Mimi Lufkin. This workshop helped to identify the root causes and effective strategies for increasing access and success of students pursuing nontraditional careers.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. No participants from Oklahoma attended representing the state leadership team.

The project conducted three national webinars from July 1, 2010 ? July 1, 2011 Oklahoma had 11 people participate in these webinars.

WISCONSIN

On March 16, 2011 Mimi Lufkin presented at a general session of the Wisconsin Diversity in STEM Conference in Madison, WI (65 in attendance)

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011 in Alexandria, VA. 7 participants from Wisconsin attended representing the state leadership team and all of the pilot sites. The team submitted an annual report as part of their Leadership Institute participation (see attachments for state team annual reports)

The project conducted three national webinars from July 1, 2010 ? July 1, 2011 Wisconsin had 23 people participate in these webinars.

WEBINARS
The project hosted three national webinars: 1) January 27, 2011 Spark Talented Minority Girls' Interest in Engineering, Female Recruits Explore Engineering ??' The FREE Project conducted by Monica Bruning had 92 attendees; 2) February 16, 2011 Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets conducted by Fred Smyth had 65 attendees, and 3) March 22, 2011 Cognitive Beliefs and Cultural Variables Matter in STEM Career Development conducted by Angela Byars-Winston had 109 attendees.
All three of these webinars are archived on the VLC. Webinar evaluation results can be found in the findings section of the annual report.

PROFESSIONAL DEVELOPMENT INSTITUTE

April 11-14, 2011 - The National Alliance for Partnerships in Equity held their annual conference. The conference was held in Arlington, VA and included four days of professional development. The conference program is included in the attachments.

The STEM Equity Pipeline Leadership Institute was held on Monday, April 11, 2011. 79 participants from the eleven participating states attended. The goals of the day's activities were: 1) to provide participants the opportunity to network, share and learn from one another about

the strategies that have been working; and 2) to provide feedback to the project staff about the project's design and efficacy as part of a larger strategic planning effort focused on sustainability.

On Tuesday, April 12 and Thursday, April 14, 2011 the STEM Equity Pipeline sponsored a series of workshops:

Increasing the Participation of Persons with Disabilities in STEM Fields
Presenters: Elissa Poel, Co-PI, New Mexico State University, Las Cruces, NM; Jessica Schmidt, Graduate Research Assistant, Regional Research Institute on Human Services at Portland State University, Portland, OR
The presenters described (1) the efforts of Reaching the Pinnacle to increase the numbers of persons with disabilities in STEM fields through advocacy, engaging learning activities, research, faculty involvement, and transition and employment options and (2) the results of a study to determine the impact of a STEM mentor program for high school students.

The NAF Career Academy Model as an Effective STEM Education Strategy
Presenters: Deanna Hanson, National Network Services Director, National Academy Foundation, New York, NY and Brenda Barry, Director, Academy of Engineering, National Academy Foundation, New York, NY
This presentation described NAF's model of career-themed academies that provide underserved high school students with access to industry-specific curricula, work-based learning experiences, and relationships with business professionals.

Promoting Career Pathways for Women in the Green Economy
Presenters: Karen Furia, National Office Coordinator, Women's Bureau, USDOL, Washington, DC; Lauren Sugerman , Women and Work Project Director, Wider Opportunities for Women, Washington, DC; and Donna Addkison, Director, Family Economic Security Program, Wider Opportunities for Women, Washington, DC
The presenters discussed (1) USDOL's 'Why Green Is Your Color: A Women's Guide to Sustainable Careers' and government-funded training projects in green construction, renewable energy, and energy efficiency, particularly those of Vermont Works for Women and (2) the tools, resources, and strategies of WOW's Green Institute and Pathways to Poverty project.

The Importance of Partnerships in Regional STEM Education Initiatives
Presenters: Timothy Nolan, Executive Director, Greater Cincinnati Tech Prep Consortium, Cincinnati, OH; Janice Urbanik, Construction Career Pathway Manager, Greater Cincinnati Workforce Network, Cincinnati, OH; and Kathy Wright, Program Facilitator, CPS Hughes STEM High School, Cincinnati, OH; and Shi O'Neill, IT Pathway Consultant, Greater Cincinnati Tech Prep, Hamilton, OH; Amy Harrelson, Director of Grants & Work Readiness, Heart of Georgia Technical College, Dublin, GA
The presenters described (1) how education, business, and industry partners formed a regional career academy that will ready students for entry-level industrial positions or additional career-oriented training and (2) how Greater Cincinnati has organized a team of 10 professionals to develop a systematic and regional STEM equity pipeline.

GUESS What? This Experiment is 'Sick'!
Presenters: Carrie Leopold, Outreach Coordinator, North Dakota State College of Science, Fargo, ND
This presentation explained why girls participating in GUESS, Girls Understanding and Exploring Stem Science, are calling their experiments 'sick' and why that's not a bad thing!

The National Girls Collaborative Project: Using Collaborative Tools to Increase Gender Equity in STEM
Presenters: Karen Peterson, Principal Investigator, National Girls Collaborative Project, Lynnwood, WA and Amy Foster, National Program Manager, National Girls Collaborative Project, Lynnwood, WA, Bria McElroy, Assistant Director, Women in Engineering, A. James Clark School of Engineering, University of Maryland, College Park, MD
This presentation showcased the strategies and tools employed by the National Girls Collaborative Project to strengthen the capacity of organizations serving girls in STEM.

Two State Models for Supporting NTO Careers Choices in STEM
Presenters: Eva Scates-Winston, Equity & Collaboration Specialist, MN State Colleges & Universities, St. Paul, MN; Karen Showers, Education Director, Counseling and Student Services , Wisconsin Technical College System , Madison, WI; Kari Krull, Career and Technical Education Coordinator , Manitowoc Public Schools, Lincoln High School , Manitowoc, WI; and Judy Stanton, Education Services, Lakeshore Technical College, Manitowoc, W
Presenters from Minnesota and Wisconsin shared how their states are integrating the strategies and processes of the STEM Equity Pipeline and the New Look projects and are applying a 'whole college' approach to supporting NTO career choices in STEM.

SECURE IT: Strategies to Encourage Careers in Cybersecurity and Information Technology
Presenters: Davina Pruitt Mentle, Ex Director/Sr Researcher, Ed Tech Policy, Research and Outreach/CyberWatch, Clarksville, MD and

Portia Pusey, Assistant Director, ERPRO/CyberWatch, MD
This presentation explored programs and initiatives that are in place to support the development and advancement of 'Careers in Cybersecurity.'

High-Tech High Heels
Presenter: Tegwin Pulley, Executive Director, High-Tech High Heels: Retired Vice President, Texas Instruments, Tegwin Pulley, Inc., Dallas, TX
This presentation discussed the High-Tech High Heels' 3-pronged approach ? teacher and counselor professional development and student camps - through a public partnership between business and education with proven results in preparing and encouraging high school girls to pursue STEM careers.

Inspiring Students to Explore STEM Education and Careers
Presenter: Yvonne Perez, Career Pioneer Network Facilitator, Idaho State University, College of Technology, Center for New Directions, Pocatello, ID and Marling Darling, CND Equity Counselor, Idaho State University, College of Technology, Center for New Directions, Pocatello, ID; Bill Hatch, Civil Rights Coordinator/Special Populations Consultant/Gender Equity Consultant, North Carolina Department of Public Instruction, Raleigh, NC
The presenters discussed Idaho's Career Pioneer Network and North Carolina's multi-partner initiative, whose goals are to inspire students of all ages to explore and pursue STEM courses of study and careers.

On Thursday, April 14 the STEM Equity Pipeline Leadership Institute luncheon speakers included Rebecca Spyke Keiser, Associate Deputy Administrator for Policy Integration, National Aeronautical and Space Administration and Kumar Garg, Policy Analyst, White House Office of Science and Technology Policy. This session was focused on federal programs and policies that support educational initiatives for increasing the engagement of women and girls in STEM fields. Members of the National Advisory Board (NAB) and representatives from the STEM Equity Pipeline state teams participated in the luncheon which included time for dialogue and sharing with members of the STEM Equity Pipeline NAB.

Outreach Activities:

National Outreach Activities ? July 1, 2010 ? June 30, 2011

The staff of the STEM Equity Pipeline project conducted 31 outreach activities which consisted primarily of conducting workshops at national or state conferences in an effort to inform professionals outside the participating State Teams about the projects professional development resources.

July 19, 2010 Women and STEM Summit, Washington, DC ? Mimi attended
September 15-17, 2010 Career and Technical Education Equity Council Conference, Tulsa, OK ? Mimi Lufkin presented 2 workshops (25 In attendance).
September 21, 2010 Albuquerque Public Schools, Albuquerque, NM ? Claudia Morrell presented a workshop for teachers and students (100 in attendance).
September 20-21, 2010 Increasing Nontraditional Participation and Completion Workshop at Southeast Kansas Education Service Center, Wichita, KS ? Courtney Reed Jenkins presented a workshop (75 in attendance)
September 30, 2010 Forum for Excellence Conference, Springfield, IL ? Mimi Lufkin was the Keynote Speaker and did a workshop in collaboration with the Illinois Center for Specialized Professional Support ? the STEM Equity Pipeline lead organization in Illinois. (30 people attended the workshop and 200 people attended the conference)
October 6, 2010 Promoting STEM Student Diversity at the regional Project Lead the Way Conference, Champaign, IL ? presented by Lynn Reha (25 in attendance)
October 20-22, 2010 Project Lead the Way's Innovation Summit, Washington, DC ? Mimi Lufkin served as a panelist in a session on best practices for increasing the participation of women in STEM (100 in attendance)
October 20, 2010 National Girls Collaborative Project Collaboration Conference and Champions Board Meeting, Washington, DC ? Mimi Lufkin attended as a board member and spoke at the luncheon about the July 19, 2010 Women in STEM event at the White House Conference Center.
October 20-22, 2010 National Career Pathways Network Conference, Dallas, TX ? Claudia Morrell presented a workshop on the project (12 in attendance)
October 25-27, 2010 National Association of State Directors of Career and Technical Education Council, Linthicum, MD ? Mimi Lufkin and Claudia Morrell attended and networked with the State Directors of CTE regarding the projects activities.
November 8, 2010 Integrated Learning: The School to Career Connection Conference, State College, PA ? Mimi Lufkin presented a workshop (13 in attendance)

November 17, 2010 Georgia IE Peer Group, Atlanta, GA ? Mimi presented a workshop (59 in attendance) with the Institutional Effectiveness staff from all the community colleges in Georgia.
November 30 ? December 1, 2010 Freshman Transition Leadership for National Educators Conference, Atlanta, GA ? Penny Paine presented (21 in attendance)
November 30 ? December 1, 2010 Joint Special Populations Advisory Committee Conference, Sacramento, CA ? Mimi presented attended and presented a workshop (26 in attendance)
December 2, 2010 Linking Education and Economic Development /Project Lead the Way Conference (60 in attendance). This session was with the PLTW teachers in the Sacramento, CA Region.
December 2 ? 4, 2010 Association for Career and Technical Education Annual Convention and Career Tech Expo, Las Vegas, NV ? Mimi Lufkin and Claudia Morrell attended and presented a workshop (7 in attendance).
December 14-16, 2010 South Carolina Department of Education Training, Columbia and Charleston, SC ? Claudia Morrell presented two workshops (162 in attendance)
January 21, 2011 The Texas STEM Equity Pipeline: A 5 Step Process to Expand Options for Women and Girls in STEM Fields, Austin, TX ? Susie Wheeler presented (13 in attendance)
March 4, 2011 Pennsylvania Association of Career and Technical Administrators, Hershey, PA ? Claudia Morrell was a 'Featured Speaker'
March 7-9, 2011 Association for Career and Technical Education National Policy Seminar, Arlington, VA ? Claudia Morrell attended
March 11, 2011 College of Southern Maryland Teaching of STEM Conference, LaPlata, Maryland ? Claudia Morrell presented (21 in attendance)
March 16, 2011 Wisconsin Diversity in STEM Conference, Madison, WI ? Mimi Lufkin presented (65 in attendance)
March 24-26, 2011 International Technology and Engineering Educators Association Conference, Minneapolis, MN ? Katherine Weber attended and presented (11 in attendance)
March 25, 2011 Career Preparation for Underrepresented Students at Eastern Iowa Community College, Davenport, IA ? Courtney Reed Jenkins presented (18 in attendance)
April 1, 2011 Career and Technical Education Community Conversation with National Organizations, Washington, DC ? Mimi Lufkin attended and presented
April 18-20, 2011 National Association for State Directors of Career and Technical Education Council Joint Spring Leadership Meeting, Washington, DC ? Mimi Lufkin and Claudia Morrell attended
April 26-27, 2011 Louisiana Department of Education Training, Alexandria, LA ? Mimi Lufkin and Claudia Morrell presented (50 in attendance)
May 5, 2011 Five Step Program Improvement Process Training at Region 20 Education Service Center, San Antonio, TX ? Mimi presented (12 in attendance)
May 10-12, 2011 NACTEI Conference, Philadelphia, PA ? Courtney attended and presented (23 in attendance)
June 6-9, 2011 National Science Foundation Joint Annual Meeting, Washington, DC ? Mimi Lufkin and Claudia Morrell attended. Mimi Lufkin presented on a panel about the July 19, 2010 Women in STEM Summit.
National Coalition for Women and Girls in Education ? Project staff participated in monthly meetings of NCWGE and provided its members with information about the project and its activities.
American Association of University Women Research Advisory Board ? The PI serves on the AUUW Research Advisory Board for its project on Women in STEM in Community Colleges and participated in two advisory board meetings.

Journal Publications

Books or Other One-time Publications

Mimi Lufkin, Claudia Morrell, Nancy Tuvesson, "Blueprint for Micromessaging to Reach and Teach Every Student", ( ). Book, Posted to our website
Bibliography: Morrell, Claudia; Lufkin, Mimi. Blueprint for Micromessaging to Reach and Teach Every Student. National Alliance for Partnerships in Equity Education Foundation, Cochranville, PA.

Web/Internet Site

URL(s):

www.stemequitypipeline.org

Description:

This is the Virtual Learning Community for the STEM Equity Pipeline Project. All project related activites, materials, announcements, calendar, links, archived webinars, expert portfolios, contact information and meeting registrations to name a few are on this site.

Other Specific Products

Product Type:

State Team Training Materials

Product Description:

We have developed a series of handouts used for State Team orientation and training. These materials can be found in the attachment to the activities section of the annual report. They include:
STEM Brochure ? an overview of the STEM Equity Pipeline project goals and activities and describes the model with each level of participation.
Description of STEM Project- A one page handout that provides a brief overview of the project and the model.
Stereotype Myths Brochure ? identifies myths about female participation in STEM and explains the facts.
Description of STEM Project- A one page handout that provides a brief overview of the project and the model.
5 Step Process ? a one page brief description of the Five Step Program Improvement Process.
STEM Career Clusters and Pathways ? identifies the eight career clusters and related pathways that define STEM career technical education programs of study for this project.
Forming a State Team ? identifies the ten steps in forming a State Team. This handout is used to assist the State Teams in the start-up phase.
State Team Roles and Responsibilities ? clearly identifies the roles and responsibilities of the project staff and the members of the State Team.

Sharing Information:

These materials are used with State Team members and are available on all State Team Share Point Sites for their use and access. We also use these materials when conducting outreach activities depending on the depth of the presentation and the interest of the audience. The content of all these materials is also available on the Virtual Learning Community at www.stemequitypipeline.org.

Product Type:

Training curriculum

Product Description:

Five Step Program Improvement Process training resources for training state and local teams in how to implement the process. The materials include power points, handouts, training exercises and worksheets. The Five Step Program Improvement Process train-the-trainer session prepares extension agents to work with local education agency (high schools and community colleges) to implement the process with the goal of increasing the participation and completion of women and girls in STEM related programs of study. The five steps are:
Step 1:Document Performance Results. The first step in the process is to describe state and school/college performance on the core indicators by comparing performance levels between schools/colleges, student populations, and programs over time. This step uses summary statistics and basic graphs and charts to document performance and identify improvement priorities.
Step 2:Identify Root Causes. The second step is to analyze performance data and use additional information and methods to determine the most important and most direct causes of performance gaps that can be addressed by improvement strategies and specific solutions. This step encourages states to use multiple methods to identify and evaluate potential causes and select a few critical root causes as the focus of improvement efforts.
Step 3:Select Best Solutions. The third step is to identify and evaluate potential solutions to performance problems, including both improvement strategies and program models, by reviewing and evaluating the underlying logic of these solutions and the empirical evidence of their effectiveness in achieving performance results.
Step 4:Pilot Test and Evaluate Solutions. The fourth step is to conduct pilot testing and evaluation of solutions. This step presents practical yet rigorous methods and tools for evaluating solutions before full implementation at the state or institutional levels.
Step 5: Implement Solutions. The fifth step is to implement fully tested solutions based on implementation plans that measure the implementation of the solution and evaluate the success of the solution in reaching the expected performance results. This step also addresses how to use evaluation results to plan the next steps in state and local improvement efforts.

Sharing Information:

All the materials are free and available to the public on our website. These resources are marketed through our online e-news and at all trainings. Participants in the STEM Equity Pipeline project are trained to use the materials and implement the process.

Contributions

Contributions within Discipline:

One of the goals of the STEM Equity Pipeline project is to increase the commitment to gender equity in STEM. We have already seen this through the diverse and large State Teams that have formed to receive training and implement STEM equity professional development. Most notable is the fact that without exception, the State Teams are composed of individuals from state agencies who have never worked together. For example this is the first time the Math Consultant and the Career Technical Education Equity Coordinator have ever worked together. The commitment of the teams has been very impressive.

The project is also very committed to creating a culture of data and accountability among the State Teams. The first step in that process was to get each of the States to submit their Perkins data on nontraditional student participation and completion of STEM related career and technical education programs. The process of requesting and using this data has identified a variety of data quality and interpretation issues for the lead State Agency in all of the States. In one case we even discovered that the State Agency had been calculating their performance measure incorrectly for the last five years. This discovery has led to the error being corrected - a significant contribution.

As participating states are reaching the end of their direct receipt of consulting and technical assistance we are seeing this work getting integrated into existing professional development efforts, while maintaining its focus on women and girls in STEM. States are also integrating the core training of the project, the institutional change process, into their applications for federal career and technical education funds as well as investing other funds in pilot site work that is showing promise.

The Five Step Program Improvement process training which was developed by the U.S. Department of Education, Office of Vocational and Adult Education and adapted by the National Alliance for Partnerships in Equity to use with programs focusing on nontraditional career preparation programs, has become a sought after training commodity. Since the STEM Equity Pipeline project started in October 2007, six states and nine local education agencies have contracted to receive the training. As the STEM Equity Pipeline staff continue to refine the training and develop additional resources this curriculum will be a significant contribution to the gender equity in STEM education community.

State's participation in this project has created significant collaborative relationships and cross agency partnerships that have resulted in joint communications, funding and a new emphasis on gender equity in STEM that did not exist before participation in this project. These states now have a significant number of extension agents who are prepared to assist with professional development in their state.

Contributions to Other Disciplines:

Contributions to Human Resource Development:

Contributions to Resources for Research and Education:

Contributions Beyond Science and Engineering:

The project director participates in a variety of coalitions in Washington, DC including the National Coalition of Women and Girls in Education, the National Coalition of Women in Jobs and Job Training and the STEM Education Coalition to name a few. As part of the NCWGE she participated in a listening session with President Obama's Transition Team where information regarding gender equity in STEM was part of the conversation.

On July 19, 2010 the National Alliance for Partnerships in Equity in collaboration with the Multinational Development for Women in Techology and the National Girls Collaborative Project worked with the White House Office of Science and Technology Policy to start a dialogue with experts in engaging women and girls in STEM and federal agency staff responsible for programs or funds that support this mission. The meeting resulted in a report and continuing work with the Adminstration on its priorities in Educate to Innovate and Race to the Top.

NAPE also conducted a review of the Race To the Top applications and reviewers scoring and comments and released a report titled False Start: A Missed Opportunity for Women and Girls in Race to the Top which is available on the NAPE website at www.napequit.org.

Although this work is not supported by this project but is funded by the National Alliance for Partnerships in Equity (NAPE), the lessons learned from the STEM Equity Pipeline project have influenced the recommendations made by NAPE to both the Administration and Congress in regards to public policy in career and technical education, STEM education and workforce development.

Conference Proceedings

Special Requirements

Special reporting requirements: None
Change in Objectives or Scope: None
Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Any Journal
Contributions: To Any Other Disciplines
Contributions: To Any Human Resource Development
Contributions: To Any Resources for Research and Education
Any Conference

STEM Equity Pipeline National Advisory Board Meeting

Double Tree Hotel Crystal City, Arlington, VA
Speaker - Washington Ballroom
Meeting - Harrison Room

Thursday, April 14, 2011

Members Present:

	First name	Last name	Organization
X	Barbara	Bitters	Association for Gender Equity Leadership in Education
X	Bridget	Brown	National Assoc. of Workforce Development Professionals
X	Connie	Cordovilla	American Federation of Teachers
X	Fatima	Goss Graves	National Women's Law Center
	Linda	Hallman	American Association of University Women
X	William A.	Howe, Ed.D.	Connecticut State Department of Education
	Joan	Kuriansky	Wider Opportunities for Women
	Susan	Lavrakas	Aerospace Industries Association
X	Diane	Matt	WEPAN
X	Karen	Peterson	EdLab Group - National Girls Collaborative Project
X	Betty	Shanahan	Society of Women Engineers
X	James R.	Stone	National Research Ctr for Career & Tech. Education
X	Debbie	Hughes (Mayer)	Project Lead the Way
X	Mary	Wiberg	CA Commission on the Status of Women
	Winnie	Rodriguez	American Assoc. for the Advancement of Science
X	Nancy	Conneely	National Assoc. of State Directors for Career & Technical Ed. Council
X	Stephen	DeWitt	Association for Career and Technical Education
X	Michael	Kaspar	National Education Association
X	Bob	Moore	Southern Regional Education Board

NSF Staff Present: Jolene Jesse, Program Officer
8 Project Personal Present: Mimi Lufkin, Claudia Morrell, Howard Glasser, Ruta Sevo, Sandra Staklis, Freda Walker, Katherine Weber, Susie Wheeler

Speaker: Rebecca Spyke Keiser, Assoc. Deputy Administrator for Policy Integration, NASA

1:30 PM Networking Session

2:00 PM National Advisory Board Introductions - Name and Organization

2:10 PM Project Status Report -
Mimi Lufkin, CEO, NAPE Education Foundation gave a short overview of the project structure and the developments over the last year. Then introduced each State Facilitator to report on state implementation the main focus of the project work. More information is provided for newer states participating, with short updates other states.

Texas - Susie Wheeler - Texas is new this year, it is the only state not funding through a state agency but a community college and has a facilitator that lives in the

State they are facilitating. Impact of project: Non-tradition student on a bookmark lead to the banner for the college website, will be on billboard on I-40. The Texas state governor's wife is joining the effort so maybe the State Bd. of Ed will support the STEM Equity Pipeline efforts. There are 4 community college pilot sites: Waco, Clarendon- wind energy technology, Amarillo-drafting and Alvin College.

Georgia - Claudia Morrell - Pilot sites selected through a screening process. 4 teams received the 5-step improvement process, monthly meeting by conference call, send most participants of all states to PDI, included two person's from the state department of education. Doing some presentations, develop some surveys, viewed presentation webinar on surveys, some mini classes established with diverse population, partnerships with women in nuclear and aviation program etc. Working on building a community of practice. They are not sitting in isolation plus there is a resource in the state facilitator to go do things. They are trying strategies and want to share and learn more. There is support at the state level and the state level Community College data person has provided rich data. DOE is not real involved and the secondary and the post-secondary do not collaborate. This project could play a part in bring state level involvement with the state colleges.

Group Discussion about Involvement: The willingness factor seems high, those are willing to step up and take risk. Why? There were 16 applications and people seemed eager and they want to help their students. Sounds like a bottom up strategies. Also wouldn't you say that GA is benefitting from what we learn from other states in earlier years of this project?

Ohio - Katherine Weber - Synergy of the partners and I would say "willingness" is a big factor for Ohio, a group of over achievers, which is great for project. Ben has done an amazing job in providing leadership. In thinking about institutionalizing they are looking at systems already in place. They also have a plan in place if funding goes away. They want to replicate for specific populations such as AA, Latinos etc. Cincinnati Consortium (20 on team) is strong and functioning from k-post-secondary/college. Formal education, workforce important and trying to get a group meet with Senator Brown's office and the team will put forward a proposal to submit that will help them understand how legislation could support what the Pipeline Project is doing. Currently there are 3 Pilot sites. Conducted a Conference call with Women in Engineering to get this group involved.

New Hampshire - Mimi Lufkin – Moving along but lost their leadership. They are still working at the local level. The teams have completed conference calls with the state facilitator. There are two pilot sites and each site is working independently. One is developing a on-line course. Working on a Pipeline of elementary, middle, HS, post-secondary, university. Both sites are at Step 2 of the Improvement Process. Milford: One pilot is doing survey to measure climate at the schools. Research is being done as part of doctrine for one person. Other site: The CC is a little different, state director is doing a statewide CC student survey and will use data with the faculty.

Need to have New Hampshire data to have any effect. Still do not have anyone at the state department to wear the hat.

Minnesota - Howard Glasser - year of transition, they are in year 3. There has been a change in leadership from one to two and also merging the New Look Projects with the STEM Equity Pipeline Project. Equity showcase held last spring. Each of the 4 Consortia are mentoring another consortia to expand the Pipeline Project and the 5-Step Improvement Process. Group Discussion: How do you feeling it is going? (Not what is happening) Mimi had a meeting at PDI so things are back on track. First leader was fantastic and second leader did not have the management capacity for this project. So now there is a plan to design an evaluation system to see what is happening in the state. There is a planned Webinar after PDI and staff will be working on the state leader to bring this person up to speed.

Iowa - Courtney Reed Jenkins the facilitator was unable to attend, so Susie Wheeler gave the report - The Professional Development for all Iowa Community College provided by the Pipeline project is the first in three decades, plus some counselors also participated. All community colleges are required to go through the 5-step improvement process training as part of their Perkins grant. An outcome of our project: Perkins 4 $ are been targeted to the Improvement process.

Group Discussion about Data: What about the data? Do we have an overall picture of who all the participants are? What would it take to unstuck this issue of getting data? Mimi responded about the data issues and the specific barriers etc. Also that data is less of problem when we work directly with a school vs. the state level. Sometimes depends who the data person is in the state, cell suppression, and interpretation of HERPA. The way WI deals with this issue is to roll to the larger program thus getting some data for school/program. Data issues are big issues, for example person's names and SS no etc where uploaded to the internet. Debbie Hughes has some data that might be valuable to the project.

Wisconsin - Howard Glasser – WI is a first year state so is completing 4th year. Doing some more of their own work and it has lead to more collaboration between the secondary and post-secondary. They are maintaining course. Working with pilot sites. It took pilots sites a 2 full years to grasp the notion of working together. So last summer they had an "aha" moment: we can all work with the Girl Scouts. Two of the pilot sites are not really doing it. State is thinking of putting $15,000 Perkins to pilot sites.

Group Discussion on Collaboration: How did you plant the seed to get out of your own silo and then work together? We had a meeting where some other partners came and presented what they had to offer and then the pilot site started to develop a path. I feel that even after the 5-step training people do not feel their confidence so they stayed in their silo. We are seeing a pattern, some projects are lining up to collaborate and some are not. People feeling confident to reach out to others that

they have never reached out so New Partners. We are adding a step 0 to the improvement process to talk about partnerships and how to work with those on different paths. What are they protecting and what can they get by collaborating? Newer states have had benefit from some of the difficulties that beginning teams had with state teams. They chose people that had Passion. Do a mental look at this, accept things are going to go wrong, transition will happen and change is going to happen, so the platform is to sustain collaboration.

Illinois - Freda Walker – 13 Community College New Look Projects serve as pilot sites and are provided support through the Illinois Center for Specialized Professional Support and it's director. There is still some discussion at the secondary state level about ways to integrate the improvement process into on-going training. Illinois STEM Equity Pipeline Team members have disseminated STEM Equity Pipeline resource materials at a variety of conferences and meetings, as well as through electronic CTE groups. Two electronic newsletters are distributed with project information and equity/STEM issues. New partnership formed with IL Agri-Women.

California - Freda Walker – The project continues to be supported and written into the annual work plan of JSPAC, a state level joint advisory committee (community college and secondary). Their annual state conference includes this project and 5-step improvement training sessions. Have not had success in finding a pilot site where the staff is willing to commit the time and energy to going through the steps. There are some sites that have gone through the training that are using the process but are not pilot sites or completing the whole process as a pilot site would.

Missouri - Mimi Lufkin – MO continues to work with pilot sites through a regional delivery system with CECs providing leadership and training throughout the state. Each CEC has a pilot site and each plot site is at a different state in the process. Some are more successful than others in implement the process. They continue to ask for a little TA and report their efforts and meet with the state facilitator. The state data system has not produced some data that is needed to track progress.

Group Discussion about models, flexibility and STEM: Since every state is different, flexibility is what has worked the best. Where would we be, if we had set on a specific model for everyone to follow? The people in these projects have a passion and are distributing seeds everywhere. We have some roots from the seed that have been scattered to be able to continue. Abstract the models that work for these characteristics or specifics. I like the idea of models so if people change then the model changes and it takes time to move from one model to another. If you have a platform then a state or campus or institute can play ball with our project and there is not the platform then participation in the project. Push in and push back - there is a balance when working with a state. I have been working with STEM that has added the arts and I think what is seen with these different models are some of the problem because there is no clear definition of STEM, which came on the scene very fast. The challenge if we want it to be systemic or and an agent of change then we

are going to have a way or entry point, A where do we enter and where is the end point. So with a group like this we need to sort this out for us. We are seeing this in all the states trying to figure out who and what and where STEM in the state. Maybe it is good. If things are working at the local level then give the money to the locals. I am struggling with "technology" and "STEM." Problem is if we are thinking about it as science and math it narrow it and limits and leaves out a lot of the world. How do we get all kids to think like a scientist? What does this all mean? Is STEM becoming the 1980's "high tech?" What is happening for kids in school? What do we mean by this? What about: Strategies that engage minds (STEM). Why don't we call it: ISTEM to mean integrated STEM?

3:15 PM Evaluation Results - A PowerPoint was given by Sandra Saklis

3:30 PM National Advisory Board Feedback Session
Strategic Planning for STEM Equity Pipeline v2.0 - Ruta Sevo
A handout with ideas gathered from the STEM Equity Pipeline Annual meeting participants was shared.

<u>Group Discussion and Advice: How the project might change strategies?</u>

1. Focus on the resources for all teachers and parents to support.
2. Address the silo issues.
3. More discussion on the pedagogy. What do we know about good teaching?
4. Cultural response, (multicultural)
5. Soft Skills
6. Can it be you extend this to the four-year setting? I can see this in the four-year environment, so go just a little bit further and add this chuck.
7. Include messages women get from their male counterpart and how teachers manage classroom environment.
8. Building on a great framework High Tech High Heels program to impact changes in the classroom climate, teaching and learning.
9. If sticking with the 5-step Improvement Process, we need the tools to help, need a guidebook, Best practicing arena (include university and work place) Tools to support need to get expanded and deepened.
10. Our competitors speak more than one language. Add more than one language factors to the process.
11. Build Career Development into model. The caution: I would be caution to move beyond high school. Literature suggested that when young women enter the higher- level systems the issues change and another set of influences. Once women go into STEM related careers: women that are successful are the ones that are more creative… Lots of different variables influence the system. So do not reach too far as harder to get.
12. One thing I like about this project, it seems to create creativity in the formal educational system.
13. Attainable goals to institutionalize.
14. The role of business is important.
15. Spin off NAPE has worked with 5 other states on this process due to project.

16. Train-the-trainer is making your project successful.
17. Include Perkins measures and step beyond to consider ESEA accountability measures etc.
18. How do we document all the lessons learned about the process? We are looking at indicators: Student, classroom, teacher, state transformation.

Group Discussion about adding another state in last year:

1. If the model takes more than one year then it could skew your results. Could let in and then say if you get a limited dose this is what you can expect.
2. What does the budget allow?
3. If you spread too thin will it jeopardize other aspects of the project?
4. Is there enough time and energy to add?
5. Could have them pay for services.

5:00 Meeting Adjourned

Staff Training
Friday, July 9 – Monday, July 12, 2010
Best Western Independence Park
Philadelphia, PA

Friday, July 9, 20010

2:00 PM	Welcome Staff Update Two New States	Mimi
2:15 PM	Introductions – each person can take 10 - 14 minutes	All
	National Office Staff	Joyce & Holly
	What key things do you do?	
	What recommendations do you have to improve your ability to fulfill your role?	
	State Facilitators (sharing about the first 3 years)	
	What key things do you do?	
	What strategies really worked in your state/s?	
	What strategies really worked in your state/s to implement the 5-Step Improvement Process?	
	What recommendations do you have to improve your ability to fulfill your role?	
	State Assignments (as reference not that you need to talk about each state separately):	
	California – Mimi Lufkin Georgia – Randy Dean (for the staff meeting) Illinois – Freda Walker Iowa – Courtney Reed-Jenkins Minnesota – Howard Glasser	Missouri – Freda Walker New Hampshire – Mimi Lufkin Ohio – Katherine Weber Texas – Susie Wheeler Wisconsin – Howard Glasser
3:45 PM	Stand and Stretch	
4:00 PM	Reflect on what has worked, project strengths and success	
6:00	Dinner at local restaurant within walking distance	

Saturday, July 10, 2010

8:30 AM	Evaluation Discussion	Mimi and Sandra
	Expectations of Facilitators	
	What we have learned so far	
	Extension Agent Reports Review	
	NSF Annual Report 2010	
	Project Outcomes for each state till end of project Sept. 30, 2012	
	Project Outcomes till end of project Sept. 30, 2012	
	Sustainability	
12:00	Networking Lunch	
1:00	The Latest and Greatest Research	Courtney
1:30	Pilot Site Discussion	
	Recommendations for Pilot Site Selection	
	Requirements of Pilots Site in the 5-StepImprovement Process	
	Resources and Templates	

3:00 Dissect and Rebuild the 5-Step Improvement Process
Professional Development Tools
- What needs to be developed – common components?
- Create a 5-Step Improvement Tool Kit/Handbook
- What about certification of trainers?

The 5 steps – create work groups
- Add a Pre-Step "Build the Team/Build Community"
- Documenting Performance Results
- Identifying Root Causes
- Selecting Best Strategies
- Pilot Testing and Evaluation
- Implementation

6:00 Dinner at local restaurant within walking distance

Sunday, July 11, 2010

8:30 AM Dissect and Rebuild the 5-Step Improvement Process
- Workgroups

12:00 Networking Lunch

1:00 Dissect and Rebuild the 5-Step Improvement Process
- Workgroups report and continue working

6:00 Dinner at local restaurant within walking distance

Monday, July 12, 2010

8:30 AM Refine and Finalize the 5-Step Improvement Process Professional Development tools

9:15 AM Virtual Learning Community Discussion Greg and Group

10:15 AM Communication Discussion
- Internal
  - SharePt Sites
  - Monthly Staff Meetings
  - Other
- External
  - Listserv
  - Pipeline Press
  - Blog on VLC – How to Share and Learn From each other?
  - Other

11:15 AM Next steps
Evaluation of this meeting

12:00 PM Adjourn, Good-bye and Safe travels

Materials (All available on the share point site)

Equipment
- Laptop (everyone bring their own)
- LCD Projector
- Marking Pens
- Flip Charts and Easel
- Training exercise materials that are not electronic

Leadership Institute
California State Report
2011

Please answer the questions below and return this report electronically to your State Facilitator by **Monday, March 21, 2011**. Send a copy to each of your state team members who will be attending the Leadership Institute. These reports are used as part of the STEM Equity Pipeline Project annual report to the National Science Foundation and are to be shared with all the state teams at the Leadership Institute on Monday, April 11, 2011. Members of the state teams will participate in a series of sessions framed around the questions. State team members will have an opportunity to meet with other state team members. Thanks for your responses.

The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)

(A) We have created an awareness of the importance of using data to determine what strategies should be implemented to improve the success of special population students – particularly those pursing nontraditional STEM training. We do this through workshops sponsored by the Joint Special Populations Advisory Committee (JSPAC). The workshops are conducted at local sites in all regions of the state. Additionally, workshops are conducted as part of conferences sponsored by partner organizations. This past year we conducted 20 workshops. At the annual JSPAC conference, our state facilitator Mimi Lufkin, presented a workshop on the "5-STEP Process for Program Improvement."

(B) We stress that the 5-Step process can be used to enhance performance on the Perkins Core Indicators. We have focused on the construction and use of the core indicators. The California Community Colleges Special Populations Collaborative Project has developed a brochure explaining the core indicators and emphasizing that in order to identify strategies to improve the data, one must know what barriers are being faced i.e. the strategy must address the performance gap.

(C) Broadening a commitment to gender equity in STEM education is a central theme of the statewide JSPAC workshops. A particular focus for California has been "Green" careers, the majority of which fall in the STEM area. The JSPAC developed and disseminated a document "Green Technology: Resources for Serving Females and Special Populations." The document stresses that as we address emerging green technology fields, we must ensure that females are included. It contains an overview of

strategies for improving access and retention to green training programs for females. The document is currently being reduced and made into a rack card that can be disseminated widely.

2. What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?

   Since we have been unable to implement a pilot project (see question 4), we must rely on statewide data, and as a result, to date we do not have conclusive evidence of change. A recent California Department of Education (CDE) 2009-2010 data report shows that the LEA Actual Level of Performance total for non-traditional (NT) participation was almost 20% higher than the State Level of Performance target. See Attachment 1 for California Community Colleges Chancellor's Office State Level NT Core Indicator trends since 2001-2002. We have collected anecdotal evidence of impact in individual classroom situations and programs. We plan to provide a pre-conference session at the JSPAC 2011 annual conference that will target schools that have failed to meet their Perkins Core Indicators. In the future we plan to monitor improvement at these individual sites (see Item 5 below)

3. How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?

   We have formed partnerships with a wide variety of organizations through the JSPAC workshops and training materials on the 5-step process and emphasizing the career opportunities available to females in STEM-related fields. Our partners include: California Industrial and Technology Education Association, the California Community College Administrators of Occupational Education, and the California Educating for Careers Conference sponsored by the California Department of Education and the California Partnership Academies. JSPAC has collaborated with other successful STEM equity projects, such as the NSF-funded CalWomen Tech Project http://www.iwitts.org/projects/calwomentech-project

4. What challenges have you faced in implementing your strategies?

   This past year we intended to initiate a pilot STEM project working with a local community college and feeder high school district to help them use the 5-step process to analyze data and close performance gaps in Computer Information Systems and Engineering. However, after several lengthy meetings and discussions, it was decided that the project, as planned, would require too much work and neither party was prepared to undertake this project at the present time. Among the concerns raised: (1) whether parental permission was needed to gather information from high school students and (2) must interviews with college students be cleared by the college's Human Subjects Review panel. We were informed, after consulting with our state facilitator, these issues had not come up with any other state-- only in California. Consequently the project has been shelved (for this year at least).

5. What activity or strategy would you want to continue or add if you had resources in the future?
   We would like to continue our effort to develop a pilot project. We are currently discussing with CDE staff the possibility of working with local sites that are being monitored because of low Perkins performance. With CCCCO staff we are discussing the possibility of piloting the use of the 5-Step

analysis in connection with the Community College Perkins Local Application process . The pilot project(s) with the greatest potential for success will be included in the JSPAC 2011-2012 workplan.

6. How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?

   The 5-step process for data review and identifying strategies to close performance gaps, and the importance of boosting enrollment of females in STEM fields, are central tenants of the Joint Special Populations Advisory Committee. By using the 5-Step process, K-12 educators, counselors, and administrators can understand how ESEA (NCLB) Program Improvement data is used to identify students as special populations and schools in need to support to meet federal improvement criteria for education. Thus the committee will sustain the goals of the STEM equity project through JSPAC's training workshops and conference and conduct an annual review of the pilot project(s) outcomes to determine continuation, expansion, or redirection.

7. What are the most valuable services you get from the STEM Equity Pipeline Project?
   The support and advice we get from our state facilitator, Mimi Lufkin. We also appreciate the resource account and scholarship support that enable us to send representatives to the Professional Development Institute each year.

8. What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?

   As one of the first states to take part in this project, it might be helpful if we had been advised to use a pilot site approach from the beginning. Perhaps we would have achieved greater success had we had the foresight to define more specific (quantitative) state STEM equity objectives.

The next questions are for the following states: CA, IA, IL, MN, MO, and WI.

9. *Who is on your State Leadership Team? Please list name and position:*
   - *Sharon Wong, California Community College Chancellor's Office*
   - *Russ Weikle, California State Department of Education*
   - *Carmen Lamha, San Francisco City College and JSPAC co-chair from the community colleges*
   - *Valerie Hesson, San Diego County Office of Education and JSPAC co-chair from K-Adult education*
   - *Marian Murphy-Shaw, Siskiyou County Office of Education and JSPAC in-coming co-chair from K-Adult education.*
   - *Tammy Montgomery, Grossmont-Cuyamaca Community College District and JSPAC administrator*
   - *Laurie Harrison, Consultant to the JSPAC*
   - *Elizabeth Wallner, Consultant to the JSPAC*

10. Is your State Leadership Team still meeting?
    We still meet regularly, primarily as a function of being members of the Joint Special Populations Advisory Committee.

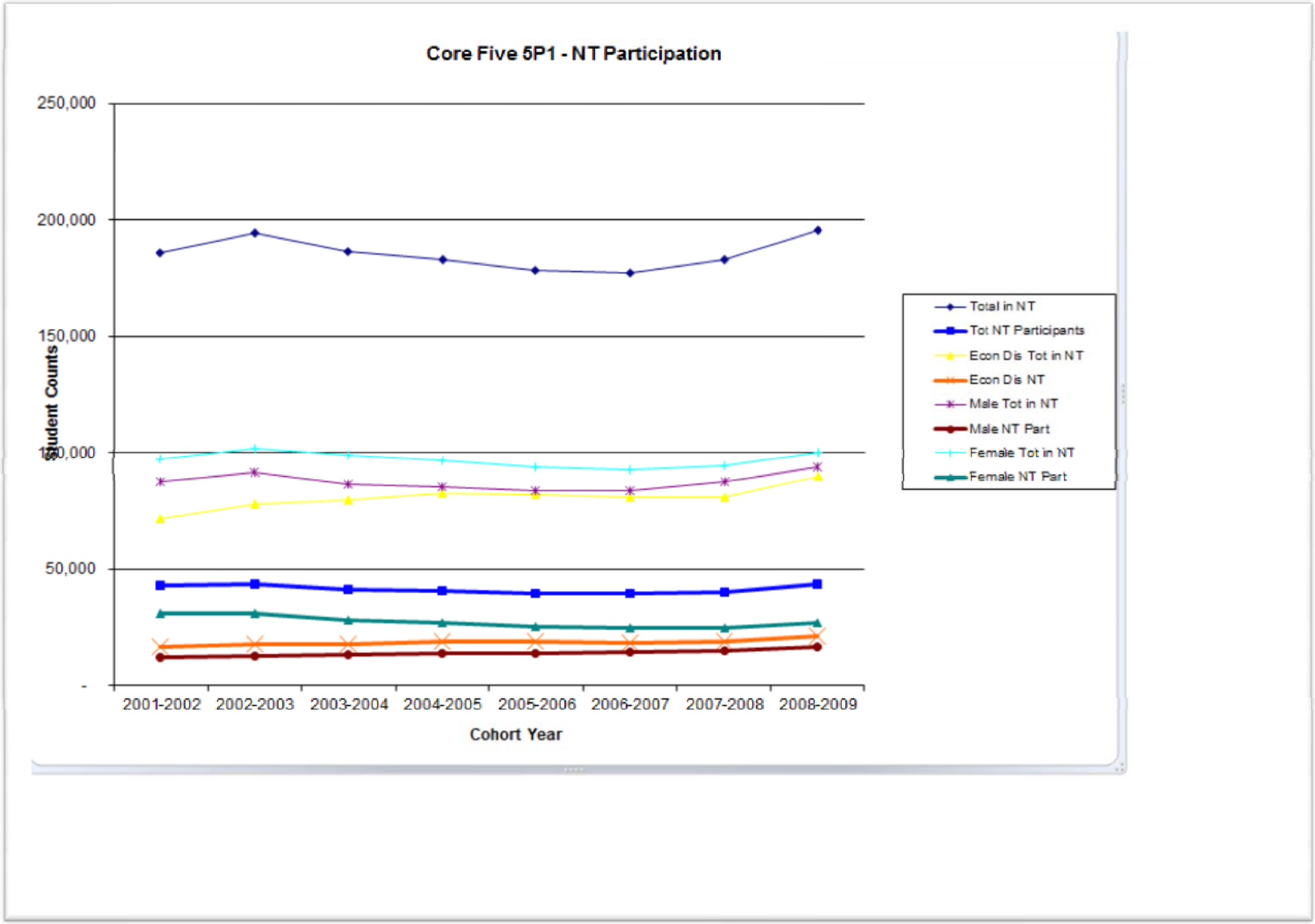
Attachment 1

California Community Colleges District Core Indicator Success Rates

Core Five 5P1 - NT Participation								
Cohort Year	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Grand Total	23.27%	22.49%	22.31%	22.24%	22.17%	22.24%	21.88%	22.27%
Female	32.15%	30.30%	28.52%	27.70%	27.10%	26.86%	26.30%	26.91%
Male	13.63%	13.99%	15.43%	16.25%	16.86%	17.36%	17.36%	17.65%
Unknown								
Non-traditional	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Displaced Homemaker	23.78%	21.45%	19.55%	21.27%	20.72%	20.08%	19.85%	19.71%
Economically Disadvantaged	23.27%	22.87%	22.80%	23.14%	23.08%	23.22%	23.31%	23.68%
Limited English Proficiency	24.21%	22.16%	21.41%	20.68%	20.23%	19.88%	19.98%	23.54%
Single Parent	24.67%	23.26%	22.03%	21.96%	21.08%	21.73%	22.15%	23.06%
Students with Disabilities	24.13%	24.21%	24.39%	24.50%	23.66%	23.72%	23.32%	23.74%
Migrant								
Technical Preparation	24.52%	21.97%	20.55%	20.57%	20.57%	20.56%	20.15%	20.32%
Core Five 5P2 - NT Completions								
Cohort Year	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Grand Total	26.70%	26.14%	26.20%	25.89%	25.73%	25.83%	25.82%	26.49%
Female	33.91%	32.14%	30.02%	27.94%	26.71%	26.10%	25.63%	26.24%
Male	18.15%	18.87%	21.52%	23.40%	24.67%	25.74%	26.35%	27.19%
Unknown								
Non-traditional	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Displaced Homemaker	28.14%	24.62%	20.96%	23.68%	22.56%	22.60%	21.67%	22.31%
Economically Disadvantaged	26.52%	26.22%	25.97%	25.82%	25.78%	25.52%	25.98%	26.55%
Limited English Proficiency	27.96%	25.90%	25.34%	24.80%	24.24%	23.51%	24.14%	29.48%
Single Parent	26.97%	25.66%	23.99%	22.63%	21.31%	22.45%	23.28%	24.56%
Students with Disabilities	26.22%	26.71%	26.44%	27.05%	25.45%	25.82%	25.49%	26.04%
Migrant								
Technical Preparation	29.61%	26.58%	24.87%	24.79%	23.61%	23.79%	23.20%	23.47%

Attachment 1

California Community Colleges District Core Indicator Success Rates



Attachment 1

California Community Colleges District Core Indicator Success Rates

Core Five 5P1 - NT Participation								
Cohort Year	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Grand Total	23.27%	22.49%	22.31%	22.24%	22.17%	22.24%	21.88%	22.27%
Female	32.15%	30.30%	28.52%	27.70%	27.10%	26.86%	26.30%	26.91%
Male	13.63%	13.99%	15.43%	16.25%	16.86%	17.36%	17.36%	17.65%
Unknown								
Non-traditional	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Displaced Homemaker	23.78%	21.45%	19.55%	21.27%	20.72%	20.08%	19.85%	19.71%
Economically Disadvantaged	23.27%	22.87%	22.80%	23.14%	23.08%	23.22%	23.31%	23.68%
Limited English Proficiency	24.21%	22.16%	21.41%	20.68%	20.23%	19.88%	19.98%	23.54%
Single Parent	24.67%	23.26%	22.03%	21.96%	21.08%	21.73%	22.15%	23.06%
Students with Disabilities	24.13%	24.21%	24.39%	24.50%	23.66%	23.72%	23.32%	23.74%
Migrant								
Technical Preparation	24.52%	21.97%	20.55%	20.57%	20.57%	20.56%	20.15%	20.32%
Core Five 5P2 - NT Completions								
Cohort Year	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Grand Total	26.70%	26.14%	26.20%	25.89%	25.73%	25.83%	25.82%	26.49%
Female	33.91%	32.14%	30.02%	27.94%	26.71%	26.10%	25.63%	26.24%
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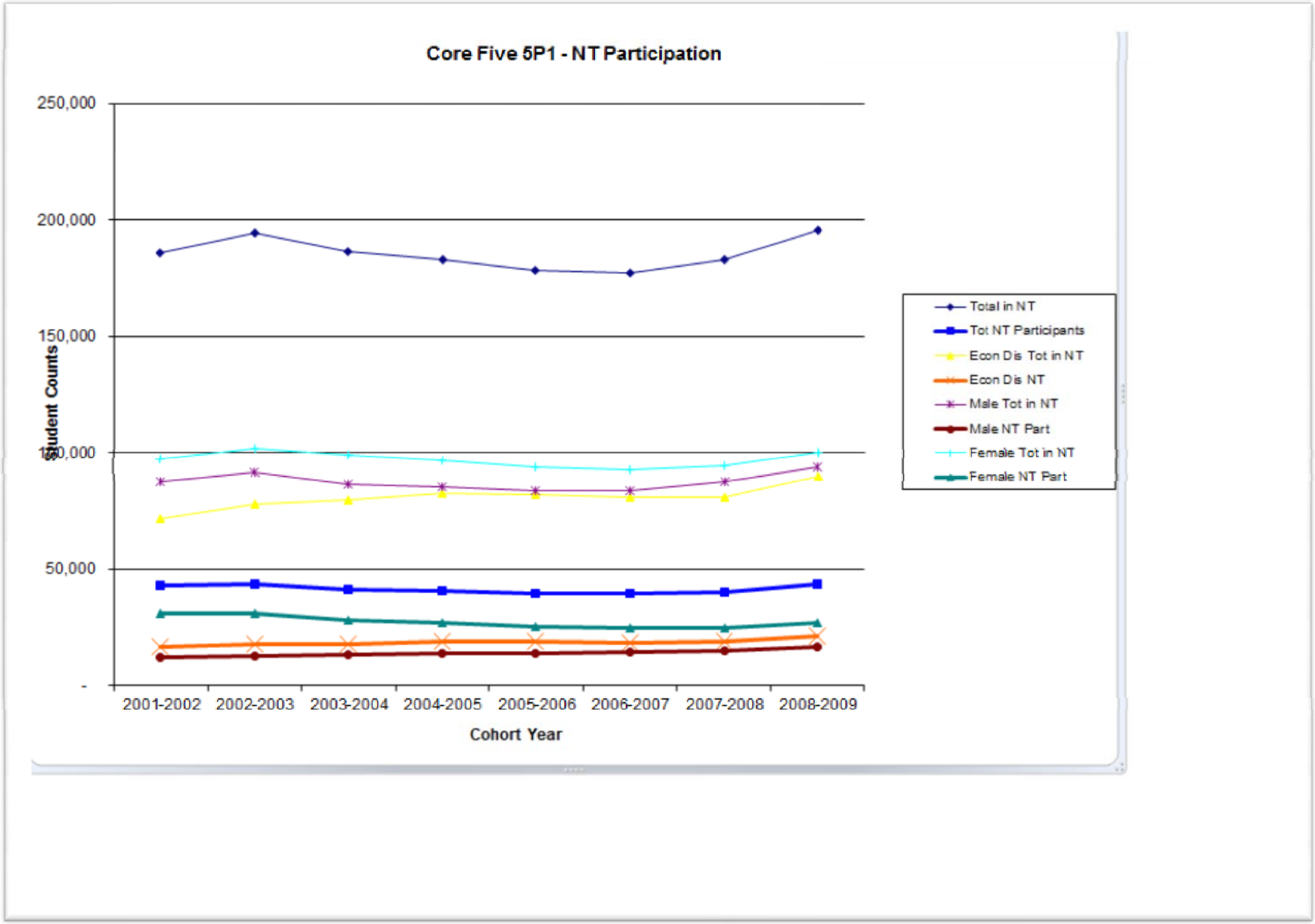
Students with Disabilities	26.22%	26.71%	26.44%	27.05%	25.45%	25.82%	25.49%	26.04%
Migrant								
Technical Preparation	29.61%	26.58%	24.87%	24.79%	23.61%	23.79%	23.20%	23.47%

Attachment 1

California Community Colleges District Core Indicator Success Rates



Leadership Institute
Georgia State Report
2011

Please answer the questions below and return this report electronically to your State Facilitator by **Monday, March 21, 2011**. Send a copy to each of your state team members who will be attending the Leadership Institute. These reports are used as part of the STEM Equity Pipeline Project annual report to the National Science Foundation and are to be shared with all the state teams at the Leadership Institute on Monday, April 11, 2011. Members of the state teams will participate in a series of sessions framed around the questions. State team members will have an opportunity to meet with other state team members. Thanks for your responses.

The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)
    1. Share information with all team members, instructors and currently enrolled students. College staff team members have made numerous presentations to high schools and counselor groups about dual and joint enrollment with emphasis on gender equity and STEM opportunities. (A, B, C)
    2. Team members made numerous presentations to community groups, conducted tours of power plant facilities for high schools, participated in activities with local elementary schools to develop curriculum, math and science standards, etc. (A & C)
    3. Changed structure of learning support math courses, introduced learning communities within study skills courses, workbook development based on program specific contexts for learning support math students. (A)
    4. Development of 3 surveys to ascertain input from currently enrolled students in target program. These included "Career Options Survey" on women's perception of society views, "Aviation Students Survey 2011" to ascertain demographic data, interests and employment goals and "Student Support Services Survey" to identify types of support services needed by students in target program (Aviation Maintenance). (A)
    5. Institutions' and Technical College System's existing accountability system provides data needed to assess progress and/or need for improvement in meeting benchmarks. (B)
    6. Colleges are implementing strategies to include other college divisions, employers, business and industry, etc. to assist in the awareness, recruitment and placement of STEM Project participants. (B)
    7. Colleges are planning and hosting seminars and workshops with STEM focus and including wide variety of campus staff, faculty and students. (C)

2. What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?

    - In 2009 and 2010, as part of the Nontraditional Technical Assistance Project and Five Step Program Improvement Process, one team initiated a comprehensive survey of middle and high school students in two Georgia counties, Columbia and McDuffie. The survey also included counselors in more than six high schools and at least eight middle schools. The NAPE surveys used were "Student Career Survey, Grades 7, 8, & 9," "Student Career Survey, Grades 9 & 10," "Student Career Survey, Grades 11 & 12" and "Am I a Fair Counselor?" A Nontraditional Program brochure was created and added to the Augusta Tech website, along with a Web Resources List for prospective or current nontraditional students, and links to resources such as a textbook Lending Library and a scholarship. Some staff development activities were provided to instructors: "Gender Fair Teaching," "Achieving Equity Through Gender-Neutral Language," and "Behaviors of the Nonbiased Educator."
    - Under the STEMEP guidance, colleges are expanding resources and increasing recruiting efforts, as well as increasing the level of support provided to females enrolled in nontraditional programs of study.
    - Colleges have attended more workshops with STEM focus and planned activities on campus to highlight STEM careers and opportunities.
    - College has developed Resource Guide has been developed to assist with students' basic needs, support services, etc.
    - Teams have been a part of the Project since November. There has been an increased awareness among colleges' staff and students.

3. How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?
    - Strengthened partnerships with local high/middle schools
    - Strengthened partnerships with local program advisory committees
    - Regular local team meetings have kept the focus on the college's goals

4. What challenges have you faced in implementing your strategies?
    - Budget constraints limit local activities
    - Team members 'other job responsibilities' and lack of dedicated time
    - Lack of awareness of STEM careers and opportunities—particularly high/middle school faculty..need more awareness training
    - Lack of academic preparedness of potential students in STEM programs
    - The Technical College System of GA (TCSG) is converting from a quarter system to a semester system July 1, 2011. One team college is also merging with another college July 1, 2011. These have created additional responsibilities for all colleges and team meetings may have scheduling difficulties.

5. What activity or strategy would you want to continue or add if you had resources in the future?
    - Teams would like to continue all activities they are currently doing, including monthly phone meetings with state facilitator.
    - Teams would like to sponsor "camps" for girls and young women.
    - Scholarships and support services
    - Continue webinars and professional development activities/meetings
    - Publications and marketing materials with focus on opportunities in STEM fields/careers

6. How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?
    - Continue to nurture new partnerships and programs
    - Continue use of data and accountability systems in place
    - TCSG continue staff to work with Project
    - At least one team has staff dedicated to Project as part of duties
    - Continue search for additional funding

7. What are the most valuable services you get from the STEM Equity Pipeline Project?
    - Training/staff development
    - Sharing of ideas
    - Access to excellent resources
    - Monthly "conference call" meetings help to keep projects on track and gives teams chance to share and ask questions, etc.
    - Meeting with four college teams, state TCSG staff and state facilitator planned for May.
    - State facilitator and NAPE staff are excellent resources and willing to assist in any way
    - Increase in STEM awareness campus wide

8. What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?
    - At times, the website is not user friendly, maybe have drop-down tabs, different format

The next questions are for the following states: CA, IA, IL, MN, MO, and WI.

9. Who is on your State Leadership Team? Please list name and position:

10. Is your State Leadership Team still meeting?

Leadership Institute
Iowa State Report
2011

Please answer the questions below and return this report electronically to your State Facilitator by **Monday, March 21, 2011**. Send a copy to each of your state team members who will be attending the Leadership Institute. These reports are used as part of the STEM Equity Pipeline Project annual report to the National Science Foundation and are to be shared with all the state teams at the Leadership Institute on Monday, April 11, 2011. Members of the state teams will participate in a series of sessions framed around the questions. State team members will have an opportunity to meet with other state team members. Thanks for your responses.

The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)

(A) For SY 2010-11, Iowa identified Project Lead the Way as the priority program area for additional 5-step training. A new and committed PLTW state coordinator has identified some short- and medium-term strategies for integrating gender equity into PLTW. One pilot site was identified for training, and the training is scheduled for spring 2011. We will present on the training to the statewide advisory board for PLTW during summer 2011.

(B) For SY 2010-11, Iowa incorporated the 5-step training into its Perkins discretionary grant application process. All community colleges that applied for the $10,000/college grant were required to participate in a 5-step training and to use an application aligned with the 5-step improvement process. The grant required colleges to identify one program nontraditional for women, one STEM program with gender inequities (could be the same program), and one program nontraditional for men. Colleges identified a variety of programs nontraditional for women/STEM, but all colleges identified nursing as their nontraditional program for men.

(C) Iowa uses a two-pronged approach to broadening the commitment to gender equity in STEM. First, members of the state leadership team continue to network and collaborate on projects. For example, the Iowa Math and Science Education Partnerships hosted a mother and daughter STEM exploration night in locations across Iowa. Second, Iowa accesses national experts to keynote at

meetings and conferences (for example, Monica Bruning presented at a regional meeting of CTE instructors on March 2).

2. What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?

   (1) The state department has changed its discretionary grant process to align with the 5-step improvement model with a specific focus on nontraditional classes and careers.
   (2) Fourteen of Iowa's 15 community colleges have participated in the 5-step training.
   (3) Middle school curriculum on wind and renewable energy is infused with gender equity principles, thanks to a collaboration between the Girl Scouts of Greater Iowa and Iowa Lakes Community College. Girl Scouts of Iowa members also participated in the Geek Squad Academy sponsored by Best Buy, and a FIRST®LEGO® League competition, resulting in the creation of a patent-pending prosthetic hand device.

3. How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?

Iowa relied on strong partnerships with community college faculty and staff to coordinate 5-step trainings across the state. Faculty and staff from the Program for Women in Science and Engineering at ISU provided resources and support for colleges. Project Lead the Way is helping to coordinate trainings specific to their faculty.

4. What challenges have you faced in implementing your strategies?

The Iowa Department of Education, like many other state education agencies, is in a period of strong staff transition. Both the CTE state director and the PLTW director positions turned over during SY 2010-11, which slowed the work of the STEM Equity Pipeline Project. In part because of the transition, workloads at the Department were partially reorganized and the STEM Equity Pipeline Project contact was stretched even thinner.

5. What activity or strategy would you want to continue or add if you had resources in the future?

On-campus, small-group training.

6. How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?

Through the discretionary grant process.

7. What are the most valuable services you get from the STEM Equity Pipeline Project?

Virtual learning community and personalized training.

8. What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?

While advance meetings are tough to schedule, we did sometimes lose trace of the project because we didn't have a regular communication strategy.

The next questions are for the following states: CA, IA, IL, MN, MO, and WI.

9. Who is on your State Leadership Team? Please list name and position:

See Attachment A*

10. Is your State Leadership Team still meeting?

Not through this project, although members of the team are in contact and networking on a variety of projects.

ATTACHMENT A
STATE OF IOWA
STEM EQUITY PIPELINE LEADERSHIP TEAM
2011

Mary Chapman, VP
Community & Workforce Development
Des Moines Area Community College
1100 7th Street
Des Moines, IA 50314
(515) 697-7702
mlchapman@dmacc.edu

Jenny Becker
Community Relations/K-12 Outreach
Rockwell Collins
400 Collins Road NE MS 124-302
Cedar Rapids, IA 52498
Phone: 319.295.8122
Fax: 319.295.9374
Email: jlbecker@rockwellcollins.com

Linda Bisgaard
Collaborations & Advocacy Director
Girl Scouts of Greater Iowa
10715 Hickman Road
Des Moines, Iowa 50322
T- 515-278-2881
C - 515-571-9325
lbisgaard@gsiowa.org

Christine Brus, Director
Women in Science and Engineering
412 Gilmore Hall
University of Iowa
Iowa City, IA 52242
319-335-3511
christine-brus@uiowa.edu

Donna Burkett, Bureau Chief
Data Dissemination Bureau
Iowa Workforce Development
1000 East Grand Avenue
Des Moines, Iowa 50319-0209
515-242-5862
Donna.Burkett@iwd.iowa.gov

Bob Driggs
Dean Math/Science
Kirkwood Community College
6301 Kirkwood Blvd. SW
Cedar Rapids . IA . 52404
319-398-5516
bob.driggs@kirkwood.edu

Nicole Franta, Post Secondary Perkins/
Dual Enrollment Coordinator
Iowa Western Community College
Council Bluffs, IA 51503
712-325-3410
nfranta@iwcc.edu

Carol A. Heaverlo, PhD Candidate
Outreach Program Coordinator
Program for Women in **S**cience and
Engineering
218 Carver Hall
Iowa State University
Ames Iowa 50011
515-294-5883
heaverlo@iastate.edu

Rachel Scott Hoepker, Legislative
Liaison/Public Information Officer
Iowa Department of Human Rights
Lucas State Office Building
Des Moines, IA 50319
515-281-4467
Rachel.Scott@iowa.gov

Leann Jacobson, President
Technology Association of Iowa
303 Locust Street, Suite 175
Des Moines, IA 50309
515-280-7700
leann@technologyiowa.org

Linda Linn, Consultant
Prairie Lakes AEA 8
23 E. 7th Street
Spencer, IA 51301
712-262-4704 Ext. 2007
llinn@aea8.k12.ia.us

Yvette McCully
Science Consultant
Iowa Department of Education
400 East 14th Street
Des Moines, IA 50319
515-281-3966
Yvette.mccully@iowa.gov

Kamali Muthukrishnan, Division Chair
Western Iowa Tech Community College
4647 Stone Avenue
Sioux City, Iowa 51102
712-274-6400
muthukk@witcc.edu

Paul Osborn
Dean, Applied Science and Tech
Hawkeye Community College
1501 East Orange Road
Waterloo, IA 50704-8015
319-296-4438
posborn@hawkeyecollege.edu

Maria Slaughter
Program Coordinator - College Now
Western Iowa Tech Community College
4647 Stone Avenue
Sioux City, Iowa 51102
712-274-8733 x1216
slaughm@witcc.edu

Karen Swanson, Coordinator
High School Programs
Indian Hills Community College
525 Grandview
Ottumwa, IA 52501
641- 683-5277
kswanson@indianhills.edu

Jeanette Thomas
Equity/Perkins Consultant
Iowa Department of Education
400 East 14th Street
Des Moines, IA 50319
515-281-3636
Jeanette.thomas@iowa.gov@

Fidelis Ubadigbo
Program Audit & Evaluation
Iowa Department of Education
400 East 14th Street
Des Moines, IA 50319
515-281-3080
Fidelis.ubadigbo@iowa.gov

Jeff Weld, Director
Iowa Mathematics and Science
Education Partnership
Center for Energy and Environmental
Education (CEEE) 18
University of Northern Iowa
319-273-2723
jeff.weld@uni.edu

Karen Zunkel, Director
Program for Women in Science and
Engineering
218 Carver Hall
Iowa State University Ames, IA, 50011
515-294-4317
kzunkel@iastate.edu

Leadership Institute
Illinois State Report
2011

Please answer the questions below and return this report electronically to your State Facilitator by **Monday, March 21, 2011**. Send a copy to each of your state team members who will be attending the Leadership Institute. These reports are used as part of the STEM Equity Pipeline Project annual report to the National Science Foundation and are to be shared with all the state teams at the Leadership Institute on Monday, April 11, 2011. Members of the state teams will participate in a series of sessions framed around the questions. State team members will have an opportunity to meet with other state team members. Thanks for your responses.

The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)
   (A) Illinois STEM Equity Pipeline Team members have disseminated STEM Equity Pipeline resource materials at a variety of conferences and meetings, as well as through electronic CTE groups. Conference presentations have included discussion of the various resources and their availability through the STEM Equity Pipeline project.
   (B) The New Look Project, a technical assistance project enhancing the success of Perkins special populations has benefited from STEM Equity Pipeline through training on the 5 Step Process. As a result of that training, the 5 Step Process is integrated into the New Look Project. The 5 Step Process is evident in the New Look Project as the participants analyze data, select effective practices based on researched root causes, implement activities and integrate feedback. Participant teams are guided through an application and final report, monthly email contact with liaisons, visits to activities, technical assistance and a closing showcase.
   (C) Illinois distributes two electronic newsletters, the iForum and CTE Works. The CTE Works-electronic resource is a regular weekly e-news release which keeps equity issues in front of approximately 500 subscribers. Entries range from cutting edge research to federal and state policy changes and resources. The iForum is distributed quarterly to secondary and postsecondary partners statewide. Information on STEM Equity National events, State professional development activities, and local best practices are included in the iForum, the electronic newsletter for the IL CTE community. Both electronic resources have noticed an increase in requests to be added to the Listservs for these electronic newsletters.
   In addition, the NTO Toolkit is an online resource which provides self-studies and lessons to enhance gender equity in the classroom. Presentations about the NTO Toolkit, especially its

section on mentoring, are important in exposing Illinois teachers to standards for an equitable classroom.

2. What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?
   (A) During FY11 thirteen New Look sites have focused on non-traditional careers. The activities which are implemented by these sites add to existing programming which invites female participation or completion of STEM programs.
   (B) The Illinois CTE performance report has been shared in a new user-friendly format. Also, the Strategies for Improvement planning tool has been updated to utilize the new format and to assist in planning consortium activities based on data. Illinois State Board of Education (ISBE) has created a work-group to identify additional data reports to assist in making data driven decisions.
   (C) Continued focus on STEM equity has increased networking and partnership development to better serve students.

3. How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?
   a. The Illinois Agri-Women have participated in several educational groups. They held a second annual Women Changing the Face of Agriculture event. This event serves to bring together young women together to hear about Agriculture Business Careers. This year's event hosted over 270 female students. Over 100 professional women, twenty volunteers, and forty-six business and industry partners supported the event through partnership and presentation. This was the 2nd annual event and is anticipated to grow. Information supporting females in agriculture related careers was created and distributed to participants. One side was focused for teachers/parents and the other was for the students in attendance.
   b. Illinois hosts a Forum of Excellence for the CTE community each fall. This year Mimi Lufkin was a featured speaker and spoke to attending educational leaders on the Role of Equity in Programs of Study.
   c. A requirement of the New Look Project involved with National Girls Collaborative Project. New Look applicants were required to register their program in the Program Directory.

4. What challenges have you faced in implementing your strategies?
   (A) The Illinois STEM Equity Pipeline Team has gotten very small, at least partly because everyone on the team is very busy, as well as statewide fiscal and travel limitations. We have utilized and are very grateful for the STEM Equity Pipeline Resources and incorporate them into existing presentations, but have not initiated much in the way of new focused STEM Equity Pipeline activities. A variety of local initiatives have evolved, however collection of this data is hard to capture, as the local entity may institute change without our knowledge. Additionally, we may be not aware of local initiatives which have been developed from our trainings and information dissemination due to being a local board-of-control state. Effort to coordinate the collection of such documentation of change is still a great need.

5. What activity or strategy would you want to continue or add if you had resources in the future?
   (A) Continue to build cooperative working relationships between the parties who are working with gender equity/nontraditional career development, STEM, and general education career and technical education programs so as to build a strong coordinated effort that serves our students in

secondary and post-secondary programs. Encourage new parties to join in working on joint efforts.

(B) Continue the support of liaison and utilization of resources with NAPE and take part in national meetings to bring new ideas to Illinois.

6. How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?

   Illinois leadership team is committed to including the goals of this project with the on-going activities in gender equity/nontraditional careers. Discussion of ways to make this a more visible effort, including but not limited to current on-going projects such as the New Look Project and CTE Works continue. It is believed that the New Look Project and CTE Works will be sustained. STEM emphasis continues to be a priority for Programs of Study Initiatives at the postsecondary level. Programs of Study related to Manufacturing, IT and Architecture and Construction were recently added to the programs being explored for development by the colleges and their partnerships.

7. What are the most valuable services you get from the STEM Equity Pipeline Project?

   This project has been an excellent source for information and resources that are shared with local educators and projects. Those who have been able to attend the annual meeting have felt that this is an invaluable experience where they have increased their knowledge and ability to incorporate new activities in the local programs.

   The STEM across Clusters handout (the color graphic) when grouped with our Program Directory Brochure is a valuable and useful resource for our CTE audiences. Many people see STEM as only those disciplines included in the acronym, but in fact STEM programs cross clusters. This graphic really helps illustrate that and we could always use more.

8. What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?

   A couple recommendations to improve the assistance to Illinois in furthering the STEM Equity Pipeline project would be to continued full participation instead of reduced and reports that are clear and show best practice activities that are being carried out in all participating states.

The next questions are for the following states: CA, IA, IL, MN, MO, and WI.

9. Who is on your State Leadership Team? Please list name and position:

   Tricia Broughton, Associate Director for Career & Technical Programs, Illinois Community College Board, Springfield, IL

   Debbie Hopper, Principal Consultant, Illinois State Board of Education, Springfield, IL

   Debbie Potts, Education Specialist for Gender Equity/Nontraditional Careers, Southern Illinois University Center for Workforce Development, Springfield, IL

   Lynn Reha, Director, Illinois Center for Specialized Professional Support, Normal, IL

10. Is your State Leadership Team still meeting?

The secondary nontraditional collaboration team meets every other month to review projects and set goals for state activities. Communication among partners is ongoing.

Leadership Institute
Missouri State Report
2011

Please answer the questions below and return this report electronically to your State Facilitator by **Monday, March 21, 2011**. Send a copy to each of your state team members who will be attending the Leadership Institute. These reports are used as part of the STEM Equity Pipeline Project annual report to the National Science Foundation and are to be shared with all the state teams at the Leadership Institute on Monday, April 11, 2011. Members of the state teams will participate in a series of sessions framed around the questions. State team members will have an opportunity to meet with other state team members. Thanks for your responses.

The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. **What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)**

Goal (A)-Piloted 5-Step Process
Piloted research based solutions
Distribution of nontraditional pamphlets/resources
Networking meetings
Interface Conference Presentation
Internal building-level teams at some sites
System of Support meetings-Greater awareness of NT & focused CTE/K-12 counselor collaboration on recruitment and retention of all students.

Goal (B)-Perkins accountability
Follow-up data (Enrollment/Completion/Placement)
Nontraditional indicator standard identified for schools
Perkins data – Enrollment/Placement/Follow-up
Process embedded as part of school-wide improvement process at some sites

Goal (C) High Tech Seminar for Females
NTUp
Breaking Traditions Awards & Diversity Award
Breaking Traditions Career Boot Camp
Networking meetings

Conference exhibit booths and presentations
Distribution of STEM Equity resources
Process embedded as part of school-wide improvement process at some sites

2. **What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?**

Increased collaboration between career centers and sending schools
Knowledge gained from data collection
Increase in general awareness of Nontraditional activities
Instructor/staff awareness of working with nontraditional students
Awareness of METS (STEM) program as a cluster
Student and parent awareness of METS
Professional development offerings
Increased marketing of career centers
Overall school improvement
Development of 5-step Process Toolkit
Creation of posters and targeted marketing materials used in sending MS & HS
Professional Development with Mark Perna (CTE marketing resource)
CTE recruitment reaching more MS & HS students

3. **How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?**

We strive to build collaborative partnerships between Career Technical Education (CTE) staff and the sending school counselors, administrators and teachers. Because of this focused effort, we have been able to gather staff and student survey data, reach more MS & HS students and let them know about CTE opportunities and how they can support their personal plans of study, engaged in recruitment and retention marketing strategies and have been able to post CTE marketing materials in schools.

Mark Perna was a new partner. He presented on CTE recruitment and retention at the MCCTA Spring Conference to CTE directors and he held a special session with the Career Education Coordinators. His same recruitment and retention information was again presented to CTE directors and some of their staff members at the NW Regional meeting in Kansas City. It is our understanding that Mark Perna is the keynote speaker for MO-ACTE Summer conference and will address recruitment and retention to all conference participants, with a follow-up session on "next steps".

4. **What challenges have you faced in implementing your strategies?**

Resources (time/money/people)
Time commitment; overload of other projects taking priority
Support/interest of personnel
Funding; strategies are relevant, but budget issues restrict implementation of solutions
Accountability responsibilities
Focus restricted solely to female

Struggle with access to proven strategies that are reasonable for time and budget constraints, without spending a lot of time doing research

5. **What activity or strategy would you want to continue or add if you had resources in the future?**

   Funds for mini-grants to implement strategies and solutions
   Funds for STEM resources/materials
   More information on small-scale, research-based, strategies and solutions
   Scholarships for nontraditional students in STEM areas

6. **How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?**

   Continued support/follow-up with schools who are committed to project
   Assistance with implementation of solutions
   Continued offering of 5-step Process for STEM and non-STEM programs based on career centers focus
   We will utilize the 5-Step Process and continue to share with appropriate agencies information about the STEM Equity Pipeline project
   Share successes of 5-Step Process schools through presentations
   Using some of CEC budget to purchase supplies and materials for recruitment efforts
   Reconvene State Leadership Team

7. **What are the most valuable services you get from the STEM Equity Pipeline Project?**

   Services
   Mimi Lufkin as Guest Speaker at Missouri Breaking Traditions Ceremony, 2011
   Two year data analysis on a school
   Participation in Professional Development Institute (PDI)

   Products:
   Hand-out materials on the NAPE website
   Sample poster ideas

8. **What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?**

   We need more assistance in the following ways;
   Funds for mini-grants to implement strategies and solutions
   Funds for STEM resources/materials
   More information on small-scale, research-based, strategies and solutions
   Scholarships for nontraditional students in STEM areas

The next questions are for the following states: CA, IA, IL, MN, MO, and WI.

9. **Who is on your State Leadership Team? Please list name and position:**

10. **Is your State Leadership Team still meeting?**
    Our state leadership team has not met. A goal for this coming year will be to reconvene this group. New members need to be recruited.

Leadership Institute
Minnesota State Report
2011

Please answer the questions below and return this report electronically to your State Facilitator by **Monday, March 21, 2011**. Send a copy to each of your state team members who will be attending the Leadership Institute. These reports are used as part of the STEM Equity Pipeline Project annual report to the National Science Foundation and are to be shared with all the state teams at the Leadership Institute on Monday, April 11, 2011. Members of the state teams will participate in a series of sessions framed around the questions. State team members will have an opportunity to meet with other state team members. Thanks for your responses.

The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)

- Participated in national SEPP webinars. Information is passed along and there has been at least one person from the Minnesota team participating. And additional strategy has been to pass along these announcements to other partners that have a connection in the recruitment and retention of students in STEM. Several other workshops and joint webinars (6) (between the SEPP teams and the MN New look teams) were conducted over the FY 2010-2011 educating participants with new information and implementation strategies on getting STEM within a classroom. The continuation throughout FY 11 with seminars/webinars will provide as one venue to provide professional development
- Communications regarding the aim of SEPP in the success of students in STEM programs of study and career pathways has been a structured strategy for gaining interest in the project and connecting other consortia to SEPP in Minnesota. Spring 2011 Request for applications were sent out and received from the pilot teams regarding future plans and required mentoring of another consortium. A series of three web-base trainings were provided to these and the MN New Look teams. Adopting a mentoring component (from the MN New Look project) has resulted in each of the four pilot teams having another Perkins consortia team to mentor:
    - St. Paul consortium ==> Itasca consortium
    - Hennepin West ==> Great River consortium
    - Mid-Minnesota ==> South Central consortium
    - Southwest Metro ==> Minneapolis consortium
- Orientation meetings are being planned between the SEPP pilot teams and their mentees.

- Merging the STEM Equity Pipeline project and the MN New Look project (nontrad CTE programs) will be implemented in Fall 2011. The aim of merging these two initiatives to provide a statewide approach to supporting student success through programs of study implementation. Program components will include mini-grants, technical assistance; webinars in coordinated with our new CCTE professional development director and various partners; professional development provided by the National SEPP office and NAPE; and other professional development offerings that become available including assistance with accountability and evaluation.

2. What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?
   - More statewide awareness of how recruitment and retention of females relates to supporting all underrepresented populations in STEM programs. Examples of partnerships that have developed or been strengthened: connecting with the newly formed Minnesota STEM Network, collaborative events now being planned form implementation with the MnSCU Office of Diversity and Multiculturalism

   Within our pilot teams:
   - Our pilots have identified barriers that they probably would not have identified without the assistance of a survey presented to a large number of female students.
   - Each pilot showed significant gains in females showing interest in STEM programs as well as enrolling in appropriate classes.
   - In the St. Paul pilot several young ladies entered into STEM type courses as a result of attending their presentation.

3. How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?
   - Webinars and joint events are being planned that provide networking and shared practices to address all underrepresented populations in STEM and related fields
   - The newly formed MN STEM network will be a helpful partner to bring awareness to the issues of recruitment and retention of females in STEM programs. The goals is for Minnesota's STEM Equity project to gain more visibility statewide through its relationship and alignment with other initiatives to address the economic needs for STEM in Minnesota

   From the pilot teams:
   - Partnerships were developed in all the pilots which included Work Force Centers, other Post Secondary institutions, and multiple secondary schools. Bringing in female engineers provided the employer outlook to females around STEM careers. Southwest Metro has begun building a partnership with society of Women Engineers to provide workshops and activities utilizing their campus facilities and broadening outreach to other high schools beyond their secondary partners. This will increase visibility of their project in that region of the state.

4. What challenges have you faced in implementing your strategies?
   - Staying connected to (and determining how best to utilize) the Minnesota's state team although the work of the Minnesota local teams moves forward with success.

- Helping local teams to align their efforts with appropriate evaluation measures that can shape future planning.
- Building off one day workshops into year long programming.
- The creation of materials needs a marketing approach to get this information in the hands of the appropriate students and parents.
- Trying to overcome the stigma that females find within what they would consider an all male class is very difficult, particularly at the secondary level.

5. What activity or strategy would you want to continue or add if you had resources in the future?

- Have a more direct focus on Parent Involvement and strategies that can successful statewide. Involvement of multiple partners will be necessary to address this critical need.
-

6. How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?
   - Pilot teams have already begun to incorporate their work into their local plans through use of allocated funds to sustain efforts.
   - State leadership dollars have been designated specifically to support the MN SEPP initiative
   - Mentoring by pilot teams will expand efforts to other consortia that need assistance with local STEM efforts as well as increase visibility and participation statewide Coordination of pilot teams with mentees. Planning with all teams will begin in April 2011 and continue through early Fall 2011 as technical assistance to support them.
   - Perkins requires strong accountability negotiated rates which this area has been a major area of concern. Since this project provides avenues to increase these rates, the sustainability will occur.

7. What are the most valuable services you get from the STEM Equity Pipeline Project?
   - Our state has utilized the expertise offered by the National Organization through webinars provided, quarterly meetings for state teams. The resources on the website including webinar archives have been very helpful.

8. What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?
   - Technical assistance for coordinating a state team and sustainability through engagement and other activities necessary.
   - Leverage SEPP with other initiatives for broader statewide initiative to support underrepresented populations in STEM
   - Have a more direct focus on Parent Involvement and strategies that have been successful on a national scale.
   - Addressing the counselor biases and lack of equity in supporting student interests, dissemination of information, etc. Counselor can also be “gatekeepers” for student persistence.

- Need to address the cultural aspects of exploring and pursing STEM, preferably through a series of webinars or other means
- Integrating strategies and tools of STEM Equity for supporting sustainability and developing support for institutional change

The next questions are for the following states: CA, IA, IL, MN, MO, and WI.

9. Who is on your State Leadership Team? Please list name and position:

The state team is somewhat inactive at this point. Attached is the list of state team members. The structure for the MN state team does not include "positions" for team members.

10. Is your State Leadership Team still meeting? No, although updates are submitted periodically. A state team meeting to update members and recruit new members will be planned for early Fall 2011.

Leadership Institute
New Hampshire State Report
2011

The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)

Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education

The pilot projects in NH are working with both K-12 schools and Institutions of Higher Education to put together pilot programs in a meaningful way that collects and analyzes data over time, with the goal of increasing the participation rate of females in STEM courses and careers. The initial steps include:

- The creation of two secondary pilot sites that include K-higher education representation on their local teams. The sites are led by Milford High School Applied Technology Center (MATC) and Sugar River Valley Area Technical Center (SRVATC) in Claremont, NH.
- Both pilot sites have created and are implementing surveys – one site with students (grade 3-12), the other site with faculty and counselors (K-12) – to help identify the root causes that are creating the low participation rates of girls in STEM related programs of study at the secondary, community college and higher education level.
- The leadership team is developing a survey to determine factors that: have contributed to selection of non-traditional careers at the community college level, factors that have influenced continued participation, and what student support services may help further study to the bachelor's level and beyond. This survey will be administered by STEM faculty interested in increasing the participation of women in their programs.

Professional development staff in NH was involved in training conducted in September of 2010 and February of 2011. The SABENS Group has integrated Gender Equity as a topic within existing STEM online "platforms". The use of the platform is just starting with UNH/Cooperative Extension's Advsiory. The MSP Project, STEM Literacy Community of Practice will hold their first "blended" on line with site based professional development this summer on JASON Project's Operation Infinite Potential (energy) and Operation Terminal Velocity (forces/robotics).

Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
The NH e-Learning for Educators program is developing professional development courses, which it will offer through OPEN NH, that will provide guidance and information that K-12 teachers, administrators, and other stakeholders, can take in order to bring awareness of the issues, and possible strategies for reversing them into the everyday teaching practices of our NH educators.

NH EPSCoR is supporting this effort and will provide on-going support for New Hampshire students to attend research institutes and connect them with on-going research. One of the pilot sites has identified an objective to double the number of girls attending the NH EPSCoR summer camp

Both of these programs are vehicles for the state and local teams to implement effective practices that are intended to increase the numbers of girls in STEM related programs of study in the participating sites and have and will be used as implementation strategies with the pilot sites.

The Perkins data which was available for both secondary and postsecondary programs disaggregated by gender, race/ethnicity and special population was made available to the pilot sites and used to identify gaps in performance in STEM programs in the sites that participated in the training in the Fall of 2010. The sites will review these data again in the Fall of 2011 to monitor progress on enrollment at the program level and core indicator performance at the institution level.

Broaden the commitment to gender equity in STEM education
The community college system is incorporating elements of gender equity in its data review and is working on getting the commitment of system leadership to support this direction.

There appears to be a commitment at the pilot sites, but it is too early to determine what strategies would work in a larger context. Both secondary pilot sites have committed significant staff resources to lead the implementation of the five step program improvement process at their campus. Milford ATC's Career Development Coordinator has incorporated this work into his job description and is including the research on root causes as part of his internship for certification. SRVTC CTE Coordinator is leading the effort with the team in Claremont. In both locations this initiative has grown beyond CTE and has become a district-wide endeavor.

NH e-Learning for Educators is attempting to do this by incorporating STEM Equity Pipeline links on its online course site, and promoting STEM Equity webinars and other information to its participants. This is a passive method and will have limited effectiveness.

2. What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?

At present, the programs are still too new to quantify any changes that have occurred. The pilot sites are working independently to best meet the needs of their individual contexts – community college STEM classes and two k-12 school systems, and NH e-learning. There has been data gathering, analysis, and some interesting revelations. However, no specific impact can be reported at this time.

The two secondary pilot sites both report significant change in awareness of the issues around equity in STEM on their campuses. At Milford ATC this will be the first time that they have engaged elementary school guidance counselors in career development activities.

3. How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?

Partnering with Mimi on the development of the online courses is instrumental in moving those courses forward and implementing them in the OPEN NH program.

Some of the pilot projects have also partnered with each other, which is something quite unique to the New Hampshire context, and combined efforts to put forth a more efficient way of implementing the project in each site. Pilot site teams included representatives from the K-12 spectrum and in some cases this was the first time some of these partners had worked together and certainly on this issue.

4. What challenges have you faced in implementing your strategies?

The original State Contact and Equity Coordinator for the NH Department of Education was a very strong leader in initiating New Hampshire's application to participate in the STEM Equity Pipeline project. Unfortunately, she retired within six months of the projects initiation in the state and passed this on to someone who was not able to continue to manage it because of personal issues. State level leadership has been a significant challenge in NH making it difficult to create a coherent team that is working toward establishing a network of support for the program, as well as promoting the same messages throughout the state. A solid and committed state leader is necessary to give support and direction to the individual groups and projects, which are working separately towards what would seem to be similar goals. Mimi and two of the state team members are working to re-establish leadership for the group. This issue however has not appeared to have affected the enthusiasm and engagement of the two secondary pilot sites who are working to implement the five step program improvement process.

It has also been a challenge to engage the original community college faculty who participated in the Phase I (Steps 1 and 2) portion of the five step program improvement process training. They have not continued to participate in monthly technical assistance calls or attended the second phase of the training. The leadership team is making an effort to reach out to them to engage them at a level within their sphere of influence and to identify their needs so future efforts can be tailored.

The two secondary pilot sites reported few challenges and are happy with the progress they are making. SRVATC has been having some issues with communication among all the schools and the winter weather causes a few of their pilot site meetings to be cancelled.

In the best case scenario, with more active methods, NH would have stronger leadership working to promote the message across various areas in the state and attract more stakeholders to our mission

5. What activity or strategy would you want to continue or add if you had resources in the future?

We need to promote awareness and a commitment to change the factors that impact gender inequity. The education community is constantly asked to do more and more with little and dwindling resources. Each additional task puts a strain on the system and dilutes effectiveness of individual programs or projects. Increasing awareness of these issues passively and actively could help educators realize the need to pay

closer attention to their teaching practices and the signals they give. If we have additional resources, I would suggest that a large scale awareness campaign, followed by some active training of all educators, not only those interested or vested in these issues, would give NH the most traction. NH is a local control state, so ideas are often more effective when they gain support and momentum from the teachers, rather than administration. Leadership is needed to take that support and momentum and produce a cohesive movement around a coherent mission and vision.

The secondary pilot sites report that the consulting and professional development has been very valuable and of high quality.

6. How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?

It is too soon in the process to determine if the Pilot projects will be able to distill the most effective strategies and disseminate those practices easily. Developing white papers, sharing results at workshops and through some kind of publicity will be the best way to share the outcome of project results and what was resolved or impacted by the process. In this economic and political climate, it is difficult to see what might be brought to bear on furthering this effort.

NH e-Learning for Educators will sustain the updating and delivery of the online courses through registration fees participants will pay to take the course. Similarly, most professional development opportunities will have a cost associated with it, so they will be continued as long as there is a need.

The pilot sites recommend that the NH Professional Development Centers be contacted and stronger efforts be made to engage them in this work as they are the logical partners to sustain this. The connection with the Perkins accountability measure for nontraditional participation and completion is also very important. Without this accountability measures the pilot sites don't think they would have been able to get the traction they have.

7. What are the most valuable services you get from the STEM Equity Pipeline Project?

Mimi Lufkin, STEM Equity Pipeline State Facilitator, is our most valuable asset. Her knowledge and passion for the project has kept most of the team functioning at the level it is. The webinars, and email messages are useful to some degree. The webinars don't seem well attended by the NH team members, so the value of the project seems to be in the one on one contribution that Mimi can provide to help individuals with their individual needs.

8. What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?

The knowledge, expertise, and materials are already in place. Assistance and support of the Pipeline project is great. Obviously, funding could help support a dedicated individual to provide state leadership.
What might help improve our situation is some team building or communication building activities that help bring the segregated parts of the project together into a more coherent team. That is probably beyond the scope of the project.

Leadership Institute
Ohio State Report 2011

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The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)

- Pilot the STEM Equity Pipeline Model at three different institutions in the state: two urban (Cincinnati and Dayton) and one rural (Marietta) representing three geographical areas of the state (A)
    - Team Cincinnati: STEM Equity Cincinnati has broadened the scope and sequence of an individual college as the lead by creating a team of ten dedicated educators from elementary education through college and into the workplace. The focus of this team centers upon sharing data analysis, leveraging resources, and laying the foundation for a regional STEM Equity pipeline that will analyze and enhance the flow of females into STEM careers from elementary school through postsecondary education and out into the workforce. Partners include the new STEM elementary school and open-enrollment STEM high school in Cincinnati, as well as Adult, Workforce and postsecondary institutions. Members of the team will discuss this innovative collaborative model in a session at the 2011 NAPE National Conference.

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- Team Dayton: Sinclair Community College (SCC) in conjunction with The Ponitz Career Technical Center (PCTC) is focusing its pilot on Construction, Engineering and Allied Health programs. The team has included Allied Health so to address low participation and program completion of males in those programs. Partners include administrators and staff from secondary, postsecondary, adult programs, as well as workforce partners in Dayton.

- Team Marietta: Washington State Community College is currently working with local Tech Prep partners to identify low enrollment programs for females in their career and technical programs, and to develop strategies to more effectively recruit and retain females in those programs. The college is also interested in exploring the pipeline of females from high school to the Associate of Science transfer programs. Baseline data is being collected for both pipelines.

- Present work of the Ohio STEM Equity Pipeline Project at regional and local conferences and meetings (A & C)
  - Ohio School Improvement Institute - November 18, 2010
    - Session title: "How to improve nontraditional participation and completion - The Ohio STEM Equity Pipeline Project"
      Presenter: Dr. Ben Williams, Project Lead
  - Ohio Economic-Education Summit IV - February 22, 2011
    - Aerospace and Materials Science Panel Participant and Table Moderator
    - Panel Title "Recruiting and Retaining Females in STEM Fields: The Ohio STEM Equity Pipeline Project"
      Presenter: Dr. Ben Williams, Project Lead
  - Ohio Association of Community Colleges Summit - March 4, 2011
    - Session title: "Increasing Access for Females to Nontraditional STEM Occupations: The Ohio STEM Equity Pipeline Project"
      Presenters: Dr. Ben Williams, Project Lead and Ms. Jennifer Spegal, Pilot Lead for Dayton Team
  - Ohio Tech Prep Workshop for Teachers (Grade 6-12) – June 14, 2011
    - Conference Theme "Engaging Students – Strategies that Work"
    - Session title: "Recruiting and Retaining Females in STEM Fields: The Ohio STEM Equity Pipeline Project"
      Presenters: Dr. Ben Williams, Project Lead and Ms. Jennifer Spegal, Pilot Lead for Dayton Team

- Expand partnerships with Ohio secondary, postsecondary, government, and Business and Industry (A and C)
  - The Ohio Leadership Team now consists of representatives from K-16 in STEM education, including representatives from the new STEM elementary school and the STEM high school in Cincinnati; various postsecondary partners from throughout the state; representatives from the larger STEM network, including the Ohio STEM Resource Network, the Ohio

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Department of Education, and Battelle, a major business leader in STEM in Central Ohio and the country.

- Through the various presentations of the last several months, other helpful strategic partnerships have been made with, for example, The Ohio State University Women in Engineering Program, a national leader in initiatives for women in Engineering, and the Society for Women Engineers.

- The 23 Tech Prep Consortia across Ohio have been informed and updated to this initiative especially through its "We are IT" programming and other STEM related activities. In addition, Two-Year College Perkins Coordinators have regularly been updated and engaged in dialogue around the work of our project at each state meeting since spring 2010.

- The Greater Cincinnati Workforce Network is directly connected through the Construction Pathway in the representation of the pathway manager, Janice Urbanik, who drives many grant-funded initiatives in southwest Ohio including an outreach program linked to Cincinnati Public Schools and supporting the YWCA's "Rosie's Girls" program.

- The major link to the Ohio STEM Learning Network comes through the University of Cincinnati's Hub, which funds STEM programming such as the STEM Summer Academy for inner city and rural poor youth to earn 10 college credits of dual enrollment through STEM courses in biotechnology, engineering and business technology.

- Career Development networks through the Kuder System (one of two career development planning software tools) assist members of the pipeline to track student choice and preference from grades 7 to 12.

- Career and Technical Education at The Ohio Department of Education has proposed to expand the work of the Ohio STEM Equity Pipeline Project to assist a number of Career and Technical secondary programs whose nontraditional participation and/or completion data has consistently been lower than their targets. (A & B)

- Our team has regularly utilized WebEx on-line meeting technology to conduct both small and larger team meetings so to collaborate in the work of this project. WebEx, which is administered through Columbus State Community College, has also been helpful in meeting with prospective partners in the community. This innovative and simple tool allows for us to meet from our desks without having to pay for travel and take the extra time needed to meet in person in some centralized location. Our larger state team only meets in person in Columbus annually. We highly recommend using such technology if other states have not already done so. (A & C)

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2. What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?

   The STEM Equity Pipeline Project has provided a structure and means by which Perkins-funded Career and Technical Programs and other STEM Programs can engage in meaningful local and regional dialogue on how to improve access to STEM careers for females and other underrepresented Ohio citizens. Everyone who has heard about this project through our presentations and more informal discussions has been excited about the resources that NAPE and our partners in other states have created to conduct meaningful research and develop strategic improvements in our STEM pipelines. The Ohio Department of Education has shown interest in using this model to assist in its efforts to improve nontraditional participation and completion as measured by the Carl D. Perkins accountability parameters.

   By March 2011, each of the three state pilot sites has completed team training on Steps One and Two of the STEM Equity Pipeline Model. The Cincinnati team has already completed the training on Steps Three through Five and they are in the process of developing strategies that can be implemented to improve their pathway of females into STEM careers. They are also focused on developing baseline data on the K-16 pipeline. Leveraging resources, identifying common "root causes" for their issues/problems, and building a regional STEM pipeline of resources and contact people will eventually assist in savings of both time and shrinking funds.

   The Dayton and Marietta teams will complete their final training in the month of April. Both of these sites are in the process of conducting focus groups to collect data on the perceptions and experiences of middle school, high school, and college students, and their counselors.

3. How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?

   One Example: The Dayton Pilot consists of the following:
   Assistant Dean, Sinclair Community College (SCC) Life and Health Sciences
   Professor, SCC Engineering
   Project Lead the Way Director
   Project Manager, SCC Pre-college Programs
   Interim Senior Director, SCC Pre-college Programs
   Director, Dayton Public Schools Curriculum
   Faculty, PCTC Engineering
   Faculty, PCTC Construction
   Faculty, PCTC Allied Health

   None are new to the project and have worked together before.

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Cincinnati:
Linking grades 2 through 16 and then into the workforce has truly begun with curriculum considerations and resources being shared across the spectrum of classrooms to careers. More coordinated efforts should begin to be seen as summer recruitment and data sharing leads to building a tracking system to follow students in the pipeline. This longitudinal effort will take a few years; however, the ground work formulated with a common training model and focus has assisted the Cincinnati Team to make large strides in this work. All partners are now using a shared software "Angel" network to post data and results regarding individual research, issues, and findings. This database will eventually assist the team to focus upon problem-centering and analytical approaches to strategies that address the main causes of attrition and or lack of retention.

4. What challenges have you faced in implementing your strategies?

   SCC Pilot Site: The challenge we are having is making sure we have all the data necessary to make sound, logical decisions on the directions we would like to take in regards to solutions.

   Cincinnati and Marietta: Every person has significant workloads within his or her organization or initiative that require highest focus and priority. Notwithstanding, these teams are managing to meet periodically and work collaboratively not only for the Five Step Model training sessions, but also to share information and issues. The main challenge remains to keep the team developing in its phases with other workload issues, severe budgetary conditions, and changes in personnel, which are demanding in terms of effort and energy.

5. What activity or strategy would you want to continue or add if you had resources in the future?

- We would like to incorporate parental/family involvement. According to the initial surveys from the Dayton pilot, the team has noted parental/family involvement has been key in determining the area of study, which is supported by the NAPE "Root Causes" research.
- Resources to study formally and in depth the data we are all collecting and align these findings to regional workforce and STEM curriculum design would be ideal. The talent of the Cincinnati Team is both edifying and impressive. Facilitation and coordination could be achieved with resources to assist the team in its development from "strive", to "thrive" and onto "arrive". "Revive" might be needed due to major workloads and demands.
- We want to collect data related to impact, allowing efforts begun in Middle School or 9th Grade to come to fruition and be documented as the students continue their education through higher education.

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6. How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?

   This project has been supported by the Ohio Association of Community Colleges (OACC) since its inception in autumn 2009. In June 2010, our leadership team defined the vision, mission and goals of this project, which extends beyond the bounds of the NSF grant that NAPE is currently administering. Ohio will continue this work for as long as the NAPE funding is provided, and our hope is to continue and expand that work after that funding has ended.

   Our Project's Scope is as follows:

   Vision Statement
   The Ohio STEM Equity Pipeline Project will systematically increase participation of underrepresented citizens in Science, Technology, Engineering and Mathematics (STEM) careers.

   Mission Statement
   The mission of this project is to use a research-based model to collaboratively and systematically increase the participation, educational completion and career placement of girls and women, and other underrepresented citizens, in Science, Technology, Engineering and Mathematics (STEM) fields in the state of Ohio.

   Ohio State Team Goals:
   - Increase public awareness and create opportunities for girls and women in Science, Technology, Engineering and Mathematics (STEM).
   - Increase participation of girls and women in nontraditional STEM fields (as identified by 25% or fewer of that gender represented in the workforce).
   - Increase persistence, retention and completion of girls and women in STEM programs at the secondary and postsecondary levels.
   - Increase job placement of females into STEM careers in Ohio.
   - Increase participation, certificate and degree completion, and job placement in STEM fields for other underrepresented groups.
   - Collaborate with and engage key stakeholders in improving opportunities for STEM.

Feedback from the Pilot Sites:
The Dayton team is working closely with the Dayton Public School system in order to sustain the project. The team has made it an initiative to keep the project going even after the pilot has been completed.

From Cincinnati: Of course, many of these initiatives are grant funded; however most are aligned to major educational or workforce institutions. Consequently, the curriculum materials and strategies will be

embedded and evaluated into the program of study from grades Six to 12 with transitions to both entry level STEM certification and licensure and most importantly the two year and four year college transition. The website **www.mypathtomyfuture.org** created a portal for curriculum work and resource sharing. Putting a student face (right now it is instructional resources for Cincinnati Public School teachers) and materials on this web site would ensure these materials reach varied audiences. The Angel site can and will continue if the initiative continues to meet member needs. Also, opening this team to more members and groups with similar missions/goals will increase not just its visibility but more importantly its effectiveness.

7. What are the most valuable services you get from the STEM Equity Pipeline Project?

Consensus throughout the leadership team and pilot sites is that the many resources available through NAPE and our NAPE consultant, Katherine Weber, have been immensely helpful. No one has felt like they have to "re-invent the wheel", which has helped immensely with "buy-in" and equipping teams with tools to help them to address their local STEM pipelines – deciding which "wheel to fix", as our Dayton Pilot members mentioned. The "no-cost" webinars and presentations from nationally recognized presenters are a real asset, as well.

For Tech Prep, the valued services are partnerships that assist the consortium to serve both its teachers and students. Ultimately, with this training and common focus as well as terminology to intelligently discuss barriers and issues, the "TRUE COMMUNITY OF LEARNERS" goal will be achieved. Nothing is more important that relationships. This project has achieved in jumpstarting constructing the future talent pipeline for STEM careers for Southwest Ohio.

8. What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?

   A formal manual and video testimonials from past STEM pipeliners would be helpful in recruiting the "right or dedicated" people for not just the training but the implementation of the work. Participants in training do not always need all of the exhaustive background information. We struggled with having too little time to do the meaningful and essential work of having the pilot sites identify their root causes and specific strategies that can be used to address them. Re-prioritized use of time within the training sessions could bring more effective results and synthesis, and less confusion. We have discussed this and are confident this can be achieved in future trainings.

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www.stemequitypipeline.org

Leadership Institute
Texas State Report
2011

Please answer the questions below and return this report electronically to your State Facilitator by **Monday, March 21, 2011**. Send a copy to each of your state team members who will be attending the Leadership Institute. These reports are used as part of the STEM Equity Pipeline Project annual report to the National Science Foundation and are to be shared with all the state teams at the Leadership Institute on Monday, April 11, 2011. Members of the state teams will participate in a series of sessions framed around the questions. State team members will have an opportunity to meet with other state team members. Thanks for your responses.

The STEM Equity Pipeline Project has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following eight questions.

1. **What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)**

- 2009-2010 Gender Equity in CTE workshops funded by a Perkins Leadership Grant. All Texas Community and Technical colleges were invited to the workshop where Mimi Lufkin presented the 5 Step Process. Each college identified one program to improve for participation and/or completion by analyzing their own Perkins Data. (A and B)

- Each college's Perkins Director or Special Populations Coordinator has received emails announcing STEM Equity Pipeline events, including webinars, and the Pipeline Press. (C)

- Four Community colleges have been selected as pilot sites to work through the 5-Step Process to increase female participation in STEM programs. (A)

- Danita McAnally presented our work to the Texas Higher Education Coordinating Board (THECB) staff as the result of a Perkins Leadership Grant for 2010-2011 "Extending the STEM Equity Pipeline to Texas". (C)

- Susie Wheeler sends emails about strategies or articles specific to a community college's identified program that each is trying to improve for Perkins 5P1 and 5P2. (B and C)

2. **What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?**

- Faculty and advisors are more aware of the importance of Perkins indicators for non-traditional genders. They understand the accountability system and its impact on the institution.

- The results of the Gender Equity in CTE workshops should be evident in the Perkins data reports for 2011-12.

3. **How have partnerships helped you reach the results described in question no 2? Were any of these partners new to your work/project and how did they help you?**

- The local independent school districts have partnered with the four pilot site community colleges to establish a relationship with these institutions.

- The THECB hosted a session for all Perkins Leadership Grant recipients to explain their work. They posted this information on their website for all institutions to access.

- We connected with the T-STEM academies and presented a breakout session at their conference in January and at Saturday workshops to help recruit girls to these academies.

- The Texas Girls Collaborative supplied information about grants and incentives for initiatives dealing with female participation in STEM.

4. **What challenges have you faced in implementing your strategies?**

- It is difficult to convince everyone of the importance of this issue. It is often placed on the back burner as other issues arise. Therefore, not all community colleges have declared one program on which to focus improvement efforts.

- Many want to go directly to Solutions without finding the Root Causes of low participation or completion. Given the limited financial resources, these institutions will be wasting precious dollars without an effective game plan.

- Colleges must recognize that participation (recruitment) is just one of the indicators, and that completion (success) must also be improved.

5. **What activity or strategy would you want to continue or add if you had resources in the future?**

- Requirement for all colleges receiving Perkins funds to choose at least one program to improve.

- Require the THECB staff to be involved in the leadership of this initiative.

- Provide mini-grants to community colleges to pay for speakers who address non-trad issues at events

6. **How will you sustain the goals or effort of the project? What will you be able to sustain when the assistance is no longer available?**

   Every Perkins Director and/or Special Populations coordinator should know how to work through the 5-Step Process. They should also be aware of resources available from the STEM Equity Pipeline.

   Community Colleges receiving Perkins funds have built relationships with the Texas State Facilitator and with Mimi Lufkin, in particular.

7. **What are the most valuable services you get from the STEM Equity Pipeline Project?**

- Direction from the STEM EP staff
- Webinars
- Ideas for professional development
- Opportunities for training
- Brochures and training materials for presentations

8. **What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?**

NAPE representative from the national office could present sessions at prominent conferences in Texas.

The next questions are for the following states: CA, IA, IL, MN, MO, and WI.

9. Who is on your State Leadership Team? Please list name and position:

10. Is your State Leadership Team still meeting?

Leadership Institute
Wisconsin State Report
2011

The STEM Equity Pipeline has three goals:

A. Build the capacity of the formal education community to implement research based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education
B. Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
C. Broaden the commitment to gender equity in STEM education

With these three goals in mind please answer the following five questions.

1. **What strategies have you implemented that have been successful in meeting these goals? (Please identify which goal(s) each strategy addresses by putting the goal's letter in parenthesis)**

State Report:

- At about the same time that Wisconsin became a partner in the STEM Equity Pipeline Project, the Wisconsin Technical College System had just conducted root cause analysis training across the state. We were strongly encouraging the WTCS Colleges to become more serious in conducting research related to Perkins Performance in particular. This was a great fit with the Five Step Improvement Process. For the Postsecondary participants, they were getting additional training and support to gather data and systematically analyze it to identify improvement strategies. They were/are encouraged to do so to improve NTO Performance Indicators in particular. (A and B)
- Our state also undertook a STEM Equity Pipeline pilot project in the Eastern part of our state (Lakeshore Technical College District). Lakeshore Technical College had some excellent partnerships with their local school districts (Sheboygan, Manitowoc and Plymouth) and were interested in seeing if their relationship could also include implementing the five step process and sharing the work of doing environmental scans, examining data and looking at other factors that might increase the participation of females in STEM courses and programs. (All)
- State Pipeline coordinators made presentations on the project and root cause research at community-based, education, and STEM related conferences. Over 1400 people were addressed in over 25 presentations. (C)
- WDPI provided $15,000 per year for 3 years, from the Perkins NTO set aside to support the work of the 3 pre-k to 12 school district pilot sites. (All)

Pilot Project Participant Report:

Lakeshore Technical College (LTC) is working with the Manitowoc, Plymouth and Sheboygan school districts as part of a pilot version of the **National STEM Equity Pipeline Pilot Project,** which seeks to attract more girls, students of color and students with disabilities to STEM-related fields. The project focuses on the pipeline in K-12 to postsecondary education to STEM degrees. (All)

The 5 Step Process Improvement model was used to examine the college's NTO enrollment and graduation data. As a result: (All)

a. A Root Cause Analysis Research Action Plan was developed to implement strategies to further explore NTO enrollment and graduation factors.
b. Developed two student surveys which address and determine factors which influence students' decision to enroll and/or persist in NTO/STEM programs. Employment, educational, societal/cultural, and career development factors are addressed. Results will be summarized during a presentation at the 2011 NAPE Conference. They will also be shared with Wisconsin post-secondary NTO Coordinators. Results will be used to develop or enhance current enrollment and retention strategies.

NTO/STEM Coordinators are active members on the college Perkins Improvement Plan Team. Enrollment and retention strategies developed from survey results will align with and be included in the college's Perkins Improvement Plan. Strategies will be implemented as grant/project activities. (All)

- LTC Pilot Partners presented at an all staff inservice in February 2011 to inform the college of activities and strategies employed to increase the participation of women and girls in STEM related programs.
- LTC faculty, management, counseling, and support staff from several college divisions contributed to the completion of the college's Environmental Scan. (A, C)
- The college's Research Department willingly and adeptly provides data and generated reports needed to complete the Environmental Scan and Action Plan. It has also assisted with the development, implementation, and compilation of NTO Survey results. (A, C)
- The research, Environmental Scan, and Root Cause Analysis Action Plan conducted and implemented as a result of the STEM Equity Pipeline and Pilot Projects serve as examples of how to integrate equity competencies into college wide research and planning. The college encourages and invites staff to train and participate in continuous process improvement. (A)
- LTC's NTO Coordinators and Tech Prep/High School Liaison Coordinators collaborate to include NTO/STEM initiatives into scheduled Tech Prep and High School events: (C)
    a. High school staff development events (Sheboygan Falls High School Teachers' Inservice)
    b. NTO/STEM events and articles are promoted via various LTC web-based and print-based publications
    c. The 2010 Summer Tech Camp featured STEM-related career/training areas
- The Lincoln High School CTE Team, Lakeshore Technical College and the Manitou Girl Scout Council collaborated in a Girls Gaining STEAM event held on Saturday, March 5th at LTC. The girls, who were in 5th and 6th grades, interacted with role models, experienced hands-on science learning projects, and earned the opportunity to earn the Science badge. Their troop leaders and parents also participated in programming to increase their awareness of career opportunities in STEM and how they might support their girls to learn more.
- Lincoln High school coordinated a week-long "NTO, What You Need to Know" activity as part of their action plan. UW-Sheboygan, Lakeland, LTC, Moraine Park, and Marian College spent a day during our lunch periods promoting non traditional careers. This was conducted in 2010 and 2011.
- Plymouth High School saw a 50% increase in the number of girls participating in their summer science camp after increasing targeted marketing efforts to girls. They shared these results with their School Board.

- Sheboygan School District collaborates with community partners to offer a girls Rocket team and STEM summer camps

2. What has changed as a result of your work in state or local level policy or practice, classroom/teacher impact, and/or female participation or completion of STEM programs?

State Report:

- The Wisconsin Department of Public Instruction (WDPI) coordinated a STEM Success For All Conference- Moving Forward in Wisconsin: Engaging Diverse Learners. The conference, held March 16, 2011, focused on strategies to promote and support STEM participation by students of color, women and girls and students with disabilities. STEM was defined more broadly than the STEM career cluster, but inclusive of career and technical education. (A & C)
- Wisconsin's Postsecondary Perkins NTO Grant Guidelines allow Colleges to target STEM NTO programs as they seek to enroll and retain students. The WTCS Virtual Resource Center provides a link (with permission) to Best Practices for enrolling and retaining nontraditional students. The STEM Equity Pipeline Project website is an additional resource. http://systemattic.wtcsystem.edu/Studentserv/virtualresource/NTO-coordinators.htm Scroll down to see NTO Participation, Root Causes and Strategies….. (A)
- The WDPI is in the process of changing the way it calculates the NTO indicator. (B)
- There is a strong commitment on the part of the STEM community in Wisconsin that created the STEM Portal, www.wistem.org to including equity and diversity information and activities. (A)

Pilot Project Participant Report:

- The NTO Pre-tech Survey and the NTO Program Survey results are being shared with instructors who teach in NTO programs. Hopefully this will reaffirm instructors' commitment to develop best practices to address and meet NTO students' needs. (B)
- Documents identifying NTO/STEM career clusters and NTO/STEM-related career clusters are available to promote and further define NTO/STEM to women and underrepresented populations
- An overall heightened awareness of STEM/NTO and STEM efforts at LTC:
  - **Experience LTC** is a day for high school juniors and seniors to visit LTC to learn about a specific program of study. This event is held twice a year and averages about 600 students in attendance. Students sign up to explore their chosen program of study, which includes the many STEM programs at LTC. A **Take the Road Less Traveled** breakout session offers girls an in-depth look and discussion of STEM-related training and careers.
  - **Project GRILL**, piloted in 2006, pairs high school students with manufacturing professionals to design and build custom grills from scratch. The 2010-2011 school year marks its fourth year. www.projectgrill.org
  - **Project Mini-Chopper** piloted in 2007 as a collaborative effort between Manitowoc County businesses, manufacturers and educators to give high school students real-life field experience building a mini-chopper. The 2010-2011 school year marks its third year. www.projectchopper.org
  - **Career Expo** came to LTC in January 2011, when all Manitowoc County high school sophomores spend the day at LTC exploring their career options. Students are able to learn about the occupations in two career clusters and are exposed to STEM initiatives and activities throughout the day.
  - **Boy Scout Camporee** is in its fourth year and will return to LTC in 2011. Each Boy Scout Camporee is held at the end of May and hosts about 200 scouts, teaching them about key careers and

programs at LTC. The scouts explored Public Safety in 2007; Trade and Industry in 2008; and Health and Human Services, Business and Technology, and General Education in 2009. Exploration of STEM and STEM-related careers will be offered in 2011.

- **Super Science Bowl** involves 16 area high school teams of five students each who compete against other teams, testing their knowledge of a broad range of science subjects. This event encourages high school students from across the country to excel in math and science and to pursue careers in those fields. This program has been in place since 1997.
- **LTC partners with the Milwaukee School of Engineering (MSOE)** so area students can begin their engineering education at LTC with an associate degree in Mechanical Design Technology. These credits provide the solid base needed to enter MSOE's Mechanical Engineering Technology bachelor's degree program.
- **A partnership between LTC and Dominion Energy Group** provides funding for high school students to take advantage of three science-based courses in the nuclear technology program. These courses are open to any high school student interested in pursuing college credit, enhancing their math and science skills, and preparing for future education and employment.
- **Medical Terminology** course is open to high school students. The course exposes students to the vocabulary they will use in any health occupation.

3. What challenges have you faced in implementing your strategies?

State Report:

- Lack of general understanding of what STEM is in the education community.
- Lack of professional time on the part of interested educators.
- Lack of expertise (or confidence in expertise) to conduct information and in-service sessions.
    - The members of our state team requested training modules to help them spread the word and foster discussions about STEM Equity.
- The training and philosophy of school counselors and career development staff stress an ethic of letting students decide rather than promoting certain careers or types (NTO) of careers.

The Pilot Project Participants provide the following:

- Staff time to develop, conduct, gather, and interpret survey results.
- Although a Perkins Improvement Plan exists, the actual implementation (staff responsibilities) of NTO/STEM Initiatives throughout college functions needs to be further defined and enforced.
- It is difficult to schedule meetings with staff from within the college and with STEM Equity Pipeline Project members from other agencies, schools, colleges, etc.
- Access to and deciphering of inter-agency/education data can be cumbersome and daunting.
- Limited overall commitment of some Pipeline Project members to the mission of the project and to equity as a whole.
- There was limited involvement of faculty and counseling staff in the 5-Step process and the action plan.
- Lack of "one" state agency or entity to oversee equity issues and initiatives.
- We have yet to identify a "pipeline" from secondary to postsecondary for NTO/STEM training.

4. How will you sustain the effort and what will you be able to sustain when the assistance is no longer available?

- The WTCS has identified NTO Enrollment and Retention as indicators of quality which WTCS programs use while engaged in the Quality Review Process (QRP) as part of AQIP accreditation requirements. The data is used by Deans and instructors to evaluate programs. The WTCS Office assists colleges to share their strategies to improve performance with regard to these measures. (B)
- The WTCS is coordinating Retention Conferences. Two were held in the past two years. Retention of NTO Students was included as a topic at both. We are also encouraging colleges to share information about how they have integrated STEM and NTO. The Webinars and training modules that have been developed and archived by the Pipeline Project will continue to be a valuable resource for us.
- Having a State Coordinator for this project was a critical component to getting us organized and for improving communications between secondary and post secondary in support of NTO efforts in our state. Gender equity is a focus of our state's STEM Web Portal. The leaders of the Portal Development are committed to creating interest in STEM among women and girls. They are strong champions for NTO.

  The Pilot Project Participants provide the following:
- This activity (collect and interpret data, develop/enhance enrollment and retention strategies) is included in the college's Perkins funded NTO grant.
- The survey instrument, results, and developed/enhanced enrollment and retention strategies will be shared with the STEM Equity Pipeline and STEM Equity Pipeline Pilot teams, as well as WTCS NTO Program Coordinators. This information may be used by other NTO/STEM programs to assess their practices and further develop their own best practices. The STEM Equity Pipeline Pilot team will serve as the college's "STEM Coordination Team" and will provide input and recommendations in the Perkins NTO Grant.
- Continue to institutionalize NTO/STEM initiatives into the college's cross-functionalities.

5. What recommendations do you have to improve the assistance that is provided through the STEM Equity Pipeline project?

- The training on steps 3-4- and 5 needs to be expanded to better help people understand and then translate the research into local activities. Several staff felt that they got lost in step 3 and then had trouble in Steps 4 and 5.
- In Wisconsin, we supported staff attendance at the state and pilot meetings with funding from the NTO set-aside under Perkins. The notion that educators will come without some financial assistance in this climate is risky.

  The Pilot Project Participants provide the following recommendation:
- Provide technical Assistance for pipeline partners who do not have research departments to retrieve and evaluate data.
- Facilitate collaboration between DPI secondary partners and CTE/CESA coordinators in other areas of the state to identify what might work in individual school districts to make the STEM/NTO postsecondary connection for women and underrepresented populations.

EQUITY Matters in C2 College & Careers

April 11-14, 2011

National Alliance for Partnerships in Equity

Professional Development Institute

DoubleTree Crystal City, VA

Program printed courtesy of xerox

Welcome!

Dear Colleagues and Friends,

On behalf of the National Alliance for Partnerships in Equity (NAPE), I welcome you to Equity Matters in College and Careers. President-Elect Jeanette Thomas and the conference planning committee have worked very hard to maintain the quality and integrity of the annual NAPE Professional Development Institute. The agenda is packed full of high-quality seminars, speakers, workshops, policy updates, and opportunity. I encourage you to network quickly to find a new friend to review the agenda, then divide and conquer the sessions between you. (Be sure to identify a time that you will meet back up with your new friend to share your learning.)

Each year that I attend the NAPE PDI, I am amazed at the caliber of leaders who take time to honor NAPE's invitation to be a part of the conference. President Obama has certainly made equity a noticeable item on his agenda. As you remember, the first bill he signed was the Lilly Ledbetter Act. This professional development institute has brought high-ranking officials from the Department of Labor and the Department of Education to meet with us. This year we will be joined by Sara Manzano-Diaz, Director of the Women's Bureau, Department of Labor, and Dr. Brenda Dann-Messier, Assistant Secretary of the Office of Vocational and Adult Education, Department of Education. The hard work of this great organization's members to sustain these valuable relationships is to be highly regarded and recognized.

The opportunity to learn about new strategies and best practices to create equitable and diverse classrooms and workplaces without barriers to opportunity will be of utmost focus over the next four days. Policy day will provide you with the opportunity to learn about the latest happenings with federal policy and provide you with tools to educate your policymakers about the work you do and the support you need to prepare diverse populations for the workforce. Time for relaxation has been scheduled in for you as well. I hope you will be able to attend the NAPE Education Foundation silent auction and the Monuments by Moonlight trolley tour. Both of these events are a great time to relax with friends.

Over the next few days, you will be surrounded by professionals vested in equity. I encourage you to participate fully in all activities, expand your equity network, ask questions, and have fun with new and old friends.

Sincerely,

Deborah Hopper

Deborah Hopper
President
National Alliance for Partnerships in Equity

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Schedule at a Glance

Monday, April 11, 2011	
Potomac View Room	
8:30 am - 9:00 am	Continental Breakfast
9:00 am - 5:00 pm	STEM Equity Pipeline Leadership Institute Pre-Conference
3:00 pm - 9: 00 pm	NAPE Education Foundation Board Meeting & Dinner - Wilson Room

Tuesday, April 12, 2011 For detailed seminar descriptions turn to page 9.		
Washington Ballroom		
7:00 am - 5:00 pm	Registration	
7:30 am - 8:00 am	Continental Breakfast	
8:00 am - 8:45 am	Opening Session with Welcome from President Deborah Hopper and NAPE Happenings with CEO Mimi Lufkin	
	Jefferson	**Harrison/Jackson**
9:00 am - Noon	**Pink Brain, Blue Brain** Lise Eliot	**Good Intentions Are Not Enough** Paul Gorski

	Washington Ballroom	Harrison	Jackson	Jefferson	Monroe
Noon - 2:00 pm	NAPE Education Foundation Awards Luncheon in the Washington Ballroom				
2:00 pm - 3:15 pm Session I	Registration	Increasing the Participation of Persons with Disabilities in STEM Fields	The NAF Career Academy Model as an Effective STEM Education Strategy	Promoting Career Pathways for Women in the Green Economy	Nontraditional Career and Technical Education Program of Study: The Implications for Equity, Economics, Social Dynamics and Employment
3:30 pm - 4:45 pm Session II	Registration	The Importance of Partnerships in Regional STEM Education Initiatives	GUESS What? This Experiment is "Sick"!	Helping CTE Teachers Work with English Language Learners	Redefining Equity in the Workplace through Woven Traditions© Cultural Competency Training
5:00 pm - 7:00 pm	Silent Auction Bidding and Networking in the Washington Ballroom (light refreshments)				

Wednesday, April 13, 2011	
Washington Ballroom	
7:30 am - 8:00 am	Continental Breakfast
8:00 am - 10:00 am	Career Technical Education Community Conversation with Brenda Dann-Messier
Public Policy Day on the Hill	
10:00 am - 11:00 am	Travel to the Hill - Capitol Visitor Center, SVC Room 212-10
11:00 am - 12:30 pm	Public Policy Panel
2:00 pm - 5:00 pm	Hill Visits
7:00 pm - 10:00 pm	Monuments by Moonlight Trolley Tour: See page 6 for details, tickets included with registration.

Schedule at a Glance

Thursday, April 14, 2011 For detailed workshop descriptions for Thursday see page 9.				
	Harrison	**Wilson**	**Monroe**	**Madison**
8:00 am - 9:00 am	NAPE Membership Meeting in the Washington Ballroom. Everyone is welcome.			
9:15 am - 10:30 am Session III	Making Higher Education Attainable for Student Parents: Opportunities and Obstacles	Building Bridges -- Language for Education and Advocacy	The National Girls Collaborative Project: Using Collaborative Tools to Increase Gender Equity in STEM	Two State Models for Supporting NTO Career Choices in STEM
10:45 am - Noon Session IV	SECURE IT: Strategies to Encourage Careers in Cybersecurity and Information Technology	Supporting Students Pursuing Nontraditional Occupations	High-Tech High Heels	Inspiring Students to Explore STEM Education and Careers
Noon - 1:30 pm	Closing Luncheon with guest speaker Rebecca Spyke Keiser - Washington Ballroom			
2:00 pm - 5:00 pm	STEM Equity Pipeline National Advisory Board Meeting - Wilson Room			

Events

STEM Equity Pipeline Pre-Conference

Monday, April 11, 2011
9:00 am - 5:00 pm

Representatives from the STEM Equity Pipeline State Teams will meet to share their accomplishments and challenges in implementing professional development efforts in their states. Participants will have the opportunity to provide input to the project's future implementation. Team members will receive technical assistance and conduct future planning for their states' activities. (Registration is required for this event for individuals who are not members of a participating state.)

Silent Auction

Tuesday, April 12, 2011
5:00 pm

Bidding on items will be open all day with the final bidding round at 5:00 pm during the networking reception. Check out the unique donations, state-specific products, or equity-related items that are donated to our Silent Auction. All proceeds are used to support the NAPE Education Foundation and its projects and are tax deductible. This event is included in your registration fee.

Monuments by Moonlight Trolley Tour

Wednesday, April 13, 2011
7:00 pm

When the sun goes down, Washington turns into a different city, and Old Town Trolley Tours knows just the right way to show off the Capital City at night! Professional tour guides will take you right to some of the city's most popular monuments and let you see the city in a different light, stopping at the Iwo Jima Memorial, FDR Memorial, Lincoln Memorial, Vietnam Veteran's Memorial, and the Korean War Memorial. The trolly will pick us up at the hotel.

Brenda Dann-Messier

Assistant Secretary for Vocational and Adult Education

U.S. Department of Education

Brenda Dann-Messier is Assistant Secretary for the Office of Vocational and Adult Education at the U.S. Department of Education. In this capacity, she leads the Department's efforts in adult and career technical education, as well as in supporting community colleges and correctional education. She oversees the administration of 11 grant programs totaling approximately $1.9 billion annually. She is the first OVAE Assistant Secretary who is also an adult educator.

From 1993 to 1996, Dr. Dann-Messier worked for the Clinton administration, serving as Secretary Richard Riley's regional representative for Region I, which includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

Prior to returning to the Department, Dr. Dann-Messier served for a decade as president of the Dorcas Place Adult and Family Learning Center, a community-based adult education agency based in Providence, RI. She also established the Developmental Education Institute for reading and math, in collaboration with the Community College of Rhode Island.

Dr. Dann-Messier earned her B.A. in history and secondary education and her master's in instructional technology from Rhode Island College. She received her Ed.D. in educational leadership from Johnson and Wales University. She also has a teaching certificate in adult basic education.

Patricia Elizondo

Senior Vice President, Global Sales Integration–ACS/AOO

Xerox Corporation

Patricia Elizondo is Senior Vice President for Global Sales Integration–ACS/AOO at Xerox Corporation. In this role, she is responsible for leading the sales integration and Go To Market of Xerox's recent $6.5 billion acquisition of Affiliated Computer Services.

Since joining Xerox in 1981, Ms. Elizondo has progressed through a number of operational, financial, and sales field management roles. Before assuming her current role, she was responsible for achieving customer and employee satisfaction and revenue and profit objectives for the eastern part of the United States. She has served on the Board of Directors of the U.S. Chamber of Commerce since February 2008.

Ms. Elizondo has received numerous honors, including being recognized by *Hispanic Engineer & Information Technology* as one of the "50 Most Important Hispanics in Technology and Business"; by *Hispanic Business* as one of the "Top 80 Hispanic Women in Business" and "Top 25 Elite Hispanic Business Leaders"; by The Women's Alliance for "Making a Difference" at Xerox; and by National Hispanic Corporate Achievers, Inc. as an "International Hispanic Corporate Achiever of the Year."

Ms. Elizondo holds a bachelor's degree in finance from Indiana University's Kelley School of Business and an MBA from University of Notre Dame.

Rebecca Spyke Keiser

Associate Deputy Administrator for Policy Integration

NASA

Rebecca Spyke Keiser is Associate Deputy Administrator for Policy Integration at NASA.

In this position, Dr. Keiser helps to implement a wide range of initiatives in support of NASA's goals and integrates the efforts of the agency's various strategic planning offices to ensure consistency with the White House and legislative direction.

Within NASA, Dr. Keiser has also served as the Executive Officer for the Deputy Administrator, where she managed the office's staff, provided policy analysis and advice, and facilitated communication across the agency; and Chief of Staff for the Exploration Systems Mission Directorate, where she led the front office team responsible for communications and cross-directorate policy formulation. She worked in NASA's Office of International and Interagency Relations as the lead for France, Spain, and Portugal, and the human spaceflight lead for Asia.

Dr. Keiser was Assistant to the Director for International Relations in the Office of Science and Technology Policy, where she made policy recommendations and represented the agency at U.S. and international meetings.

Keiser earned a B.A. in Japanese studies from Wellesley College, an M.S. in politics of the world economy from the London School of Economics, and a Ph.D. in international studies from the University of South Carolina.

Speakers

Sara Manzano-Díaz

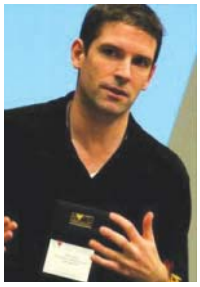
Director, Women's Bureau

U.S. Department of Labor

Sara Manzano-Díaz is Director of the U.S. Department of Labor's Women's Bureau. She has more than 25 years of federal, state, and judicial experience, including 16 years in senior management at the federal government level. Previously, she was Pennsylvania Secretary of State for Regulatory Programs. In that role, she was responsible for protecting the health, safety and welfare of the public by overseeing the licensure of approximately 1 million professionals. She also served on Governor Rendell's STEM Initiative Team.

Ms. Manzano-Díaz worked in various capacities at the U.S. Department of Housing and Urban Development, including as Deputy General Counsel for Civil Rights and Litigation, where she enforced fair housing, civil rights and anti-discrimination laws. In New York, she served as Assistant Attorney General, conducting investigations into and prosecuting allegations of consumer fraud, and as a Judicial Assistant and Pro Se Attorney in the New York State Judiciary. She served as co-chair of The Forum of Executive Women's Mentoring Committee and participated in Madrinas, a program that encourages at-risk Latina girls to finish high school and attend college.

Ms. Manzano-Díaz holds a B.S. in public relations and communications from Boston University and a J.D. from Rutgers University School of Law.



Paul C. Gorski

Founder

EdChange

Paul Gorski is Assistant Professor of Integrative Studies in George Mason University's New Century College, where he teaches classes on class and poverty, educational equity, and environmental justice. He has been an active consultant, presenter, and trainer for twelve years, conducting workshops and providing guidance to schools and community organizations committed to equity and diversity. Founder of EdChange and the Multicultural Pavilion, focused on critical multicultural education. He earned a doctorate in Educational Evaluation at the University of Virginia. He continues to publish and present in education-focused forums on topics including white privilege and racism, anti-poverty education and economic justice, and multicultural organizational transformation. He lives in Washington, DC, with his partner, Jennifer, and their cats, Felix, Poo-Poo, Meepy, Unity, and Buster.

Lise Eliot

Associate Professor

The Chicago Medical School of Rosalind Franklin University of Medicine and Science

Lise Eliot is Associate Professor of Neuroscience at The Chicago Medical School of Rosalind Franklin University of Medicine and Science. A Chicago native, she received an A.B. degree from Harvard University, a Ph.D. from Columbia University, and did post-doctoral research at Baylor College of Medicine in Houston. Author of Pink Brain Blue Brain: How Small Differences Grow into Troublesome Gaps – And What We Can Do About it, Dr. Eliot explores the latest science from conception to puberty and zeroes in on the precise differences between boys and girls, reining in harmful stereotypes. In addition to teaching and writing, Dr. Eliot lectures widely on children's brain and mental development. She lives in Lake Bluff, Illinois with her husband and their 15-year-old daughter and 13- and 10-year-old sons.

NAPE would like to express extreme gratitude to this year's advertisers and sponsors for their continued support and to all of you who graciously donated items for the annual silent auction!

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National Women's Law Center
Quality Float Works
Sally Ride Science

Session Descriptions

Tuesday, April 12
9 am - Noon

Good Intentions Are Not Enough: Best Practices and Worst Pitfalls in Diversity Initiatives - Harrison/Jackson

Paul C. Gorski, Founder, EdChange, and Assistant Professor of Integrative Studies in George Mason University's New Century College, Washington, DC

In a study on the effectiveness of diversity initiatives in schools, colleges, and workplaces across the U.S., Dr. Gorski found that those who do care about equity concerns tend to spend their energies and resources on programs and policies that have nothing to do with the underlying issues which make our contexts inequitable, exclusive, and unwelcoming to some members of our communities. In this presentation, both the "pitfalls" and "best practices" of diversity and inclusion initiatives will be discussed. Specific attention will be paid to the "hidden" or "implicit" cultures that persist in educational and work environments-those social and cultural conditions which often are, from the perspective of people from privileged backgrounds, invisible or unintentional, but which contribute to racial, sexual orientation, gender, and other inequities.

Pink Brain, Blue Brain? Females and Males in Math and Science - Jefferson

Lise Eliot, Associate Professor of Neuroscience at The Chicago Medical School of Rosalind Franklin University of Medicine and Science

Hear the latest science related to female brain development, including the role of genes, hormones, and environmental influences, and how social factors are proving to be far more powerful than popularly conceived. Calling on years of exhaustive research and her own work in the field of neuroplasticity, Dr. Eliot argues that infant brains are so malleable that small differences at birth become amplified over time, as parents, teachers, peers—and the culture at large—unwittingly reinforce gender stereotypes. Learn concrete ways educators can help females and males rein in harmful stereotypes. By appreciating how sex differences emerge—rather than assuming them to be fixed biological facts—we can help all children reach their fullest potential, close the troubling gaps between boys and girls, and ultimately end the gender wars that currently divide us.

Tuesday April 12 - Session I
2 pm - 3:15 pm

Increasing the Participation of Persons with Disabilities in STEM Fields - Harrison

Elissa Poel, Co-PI, New Mexico State University, Las Cruces, NM
Jessica Schmidt, Graduate Research Assistant, Regional Research Institute on Human Services at Portland State University, Portland, OR

The presenters will describe (1) the efforts of Reaching the Pinnacle to increase the numbers of persons with disabilities in STEM fields through advocacy, engaging learning activities, research, faculty involvement, and transition and employment options and (2) the results of a study to determine the impact of a STEM mentor program for high school students.

The NAF Career Academy Model as an Effective STEM Education Strategy - Jackson

Deanna Hanson, National Network Services Director, National Academy Foundation, New York, NY
Brenda Barry, Director, Academy of Engineering, National Academy Foundation, New York, NY

This presentation will describe NAF's model of career-themed academies that provide underserved high school students with access to industry-specific curricula, work-based learning experiences, and relationships with business professionals.

Nontraditional Career and Technical Education Program of Study: The Implications for Equity, Economics, Social Dynamics, and Employment - Monroe

Fidelis Ubadigbo, Education Programs Consultant (Accountability Specialist), Iowa Department of Education, Des Moines, IA

This presentation will interpret national data on gender participation in federally identified nontraditional CTE programs in terms of the social implications, wages earned, and equity.

Promoting Career Pathways for Women in the Green Economy - Jefferson

Karen Furia, National Office Coordinator, Women's Bureau, USDOL, Washington, DC
Lauren Sugerman, Women and Work Project Director, Wider Opportunities for Women, Washington, DC
Donna Addkison, Director, Family Economic Security Program, Wider Opportunities for Women, Washington, DC

Session Descriptions

The presenters will discuss (1) USDOL's "Why Green Is Your Color: A Women's Guide to Sustainable Careers" and government-funded training projects in green construction, renewable energy, and energy efficiency, particularly those of Vermont Works for Women and (2) the tools, resources, and strategies of WOW's Green Institute and Pathways to Poverty project.

Tuesday April 12 - Session II 3:30 pm - 4:45 pm

The Importance of Partnerships in Regional STEM Education Initiatives - Harrison

Timothy Nolan, Executive Director, Greater Cincinnati Tech Prep Consortium, Cincinnati, OH
Janice Urbanik, Construction Career Pathway Manager, Greater Cincinnati Workforce Network, Cincinnati, OH
Kathy Wright, Program Facilitator, CPS Hughes STEM High School, Cincinnati, OH
Shi O'Neill, IT Pathway Consultant, Greater Cincinnati Tech Prep, Hamilton, OH
Amy Harrelson, Director of Grants & Work Readiness, Heart of Georgia Technical College, Dublin, GA

The presenters will describe (1) how education, business, and industry partners formed a regional career academy that will ready students for entry-level industrial positions or additional career-oriented training and (2) how Greater Cincinnati has organized a team of 10 professionals to develop a systematic and regional STEM equity pipeline.

GUESS What? This Experiment is "Sick"! - Jackson

Carrie Leopold, Outreach Coordinator, North Dakota State College of Science, Fargo, ND

This presentation will explain why girls participating in GUESS, Girls Understanding and Exploring Stem Science, are calling their experiments "sick" and why that's not a bad thing!

Redefining Equity in the Workplace through Woven Traditions© Cultural Competency Training - Monroe

Monica Marsh, Principal, D. Russel Lee Career Technology Center, Butler Technology Career Development Schools, Hamilton, OH

This interactive session will provide you with tips in creating a Culturally Competent Career Portfolio, highlighting those crucial "soft skills" that complement technical skills and result in career success.

Helping CTE Teachers Work with English Language Learners - Jefferson

Lakshmi Mahadevan, Assistant Professor, Texas AgriLife Extension Service, College Station, TX
Miranda Walichowski, Assistant Professor, Texas A&M University
Rick Peterson, Associate Professor, Texas AgriLife Extension Service, College Station, TX

This presentation will provide an overview of a professional development module for CTE teachers to more effectively work with English Language Learners.

Thursday, April 14 - Session III 9:15 am - 10:30 am

Making Higher Education Attainable for Student Parents: Opportunities and Obstacles - Harrison

Kevin Miller, Senior Research Associate, Institute for Women's Policy Research, Washington, DC
Sherrill Mosee, President and Founder, Family Care Solutions, Inc.
Abigail Newcomber, Policy Analyst, Workforce Development, Center for Law and Social Policy (CLASP)

This presentation will highlight the key demographic characteristics of the student parent population nationwide, discuss the challenges facing student parents in their pursuit of postsecondary education, and provide examples of policy, programmatic, and institutional supports available to assist student parents in accessing, persisting in, and completing postsecondary degrees and certificates.

Building Bridges — Language for Education and Advocacy - Wilson

Donna Addkison, Director, Family Economic Security Program, Wider Opportunities for Women, Washington, DC
Matt Unrath, Program Associate, Family Economic Security Program, Wider Opportunities for Women, Washington, DC

WOW and Lake Research Partners researched how Americans talk about equity, economic security, and the American Dream. This presentation will share the findings and will discuss how they can enhance your projects and programs and frame your discussions with policymakers and funders.

Session Descriptions

The National Girls Collaborative Project: Using Collaborative Tools to Increase Gender Equity in STEM - Monroe

Karen Peterson, Principal Investigator, National Girls Collaborative Project, Lynnwood, WA
Amy Foster, National Program Manager, National Girls Collaborative Project, Lynnwood, WA
Bria McElroy, Assistant Director, Women in Engineering, A. James Clark School of Engineering, University of Maryland, College Park, MD

This presentation will showcase the strategies and tools employed by the National Girls Collaborative Project to strengthen the capacity of organizations serving girls in STEM.

Two State Models for Supporting NTO Careers Choices in STEM - Madison

Eva Scates-Winston, Equity & Collaboration Specialist, MN State Colleges & Universities, St. Paul, MN
Karen Showers, Education Director, Counseling and Student Services , Wisconsin Technical College System, Madison, WI
Kari Krull, Career and Technical Education Coordinator, Manitowoc Public Schools, Lincoln High School , Manitowoc, WI
Judy Stanton, Education Services, Lakeshore Technical College, Manitowoc, WI

Presenters from Minnesota and Wisconsin will share how their states are integrating the strategies and processes of the STEM Equity Pipeline and the New Look projects and are applying a "whole college" approach to supporting NTO career choices in STEM.

Thursday, April 14 - Session IV
10:45 am - Noon

SECURE IT: Strategies to Encourage Careers in Cybersecurity and Information Technology - Harrison

Davina Pruitt Mentle, Executive Director/Sr Researcher, Ed Tech Policy, Research and Outreach/CyberWatch, Clarksville, MD
Portia Pusey, Assistant Director, ERPRO/CyberWatch

This presentation will explore programs and initiatives that are in place to support the development and advancement of "Careers in Cybersecurity."

Supporting Students Pursuing Nontraditional Occupations - Wilson

Anne Sourbeer Morris, President, A. Morris Consulting, LLC, Clemmons, NC
Valjean Wright, Director of Developmental Studies & Perkins Grant Coordinator, Harcum College, Bryn Mawr, PA

The presenters will discuss the findings of doctoral research and systematic surveys of students pursuing nontraditional occupations to understand barriers and facilitators and to identify, develop, and implement the services that they need for success.

High-Tech High Heels - Monroe

Tegwin Pulley, Executive Director, High-Tech High Heels, Tegwin Pulley, Inc., Dallas, TX

This presentation will discuss the High-Tech High Heels' 3-pronged and impactful approach to encourage and prepare girls to pursue STEM degrees.

Inspiring Students to Explore STEM Education and Careers - Madison

Yvonne Perez, Career Pioneer Network Facilitator, Idaho State University, College of Technology, Center for New Directions, Pocatello, ID
Marlene Darling, CND Equity Counselor, Idaho State University, College of Technology, Center for New Directions, Pocatello, ID
Bill Hatch, Civil Rights Coordinator/Special Populations Consultant/Gender Equity Consultant, North Carolina Department of Public Instruction, Raleigh, NC

The presenters will discuss Idaho's Career Pioneer Network and North Carolina's multi-partner initiative, whose goals are to inspire students of all ages to explore and pursue STEM courses of study and careers.

The People

National Office Staff

Mimi Lufkin
Chief Executive Officer

Claudia Morrell
Chief Operating Officer

Joyce Ayers
Manager of Finance & Administration

Nancy Tuvesson
Research Associate

STEM Equity Pipeline Staff

Year One Participants

California
Mimi Lufkin - Facilitator

Illinois
Freda Walker - Facilitator

Missouri
Freda Walker - Facilitator

Oklahoma
Rick Larkey - Facilitator

Wisconsin
Howard Glasser - Facilitator

Year Two Participants

Iowa
Courtney Reed-Jenkins - Facilitator

Minnesota
Howard Glasser - Facilitator

Year Three Participants

Ohio
Katherine Weber - Facilitator

New Hampshire
Mimi Lufkin - Facilitator

Year Four Participants

Georgia
Claudia Morrell - Facilitator

Texas
Susie Wheeler - Facilitator

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Lou Ann Hargrave, Stillwater, OK

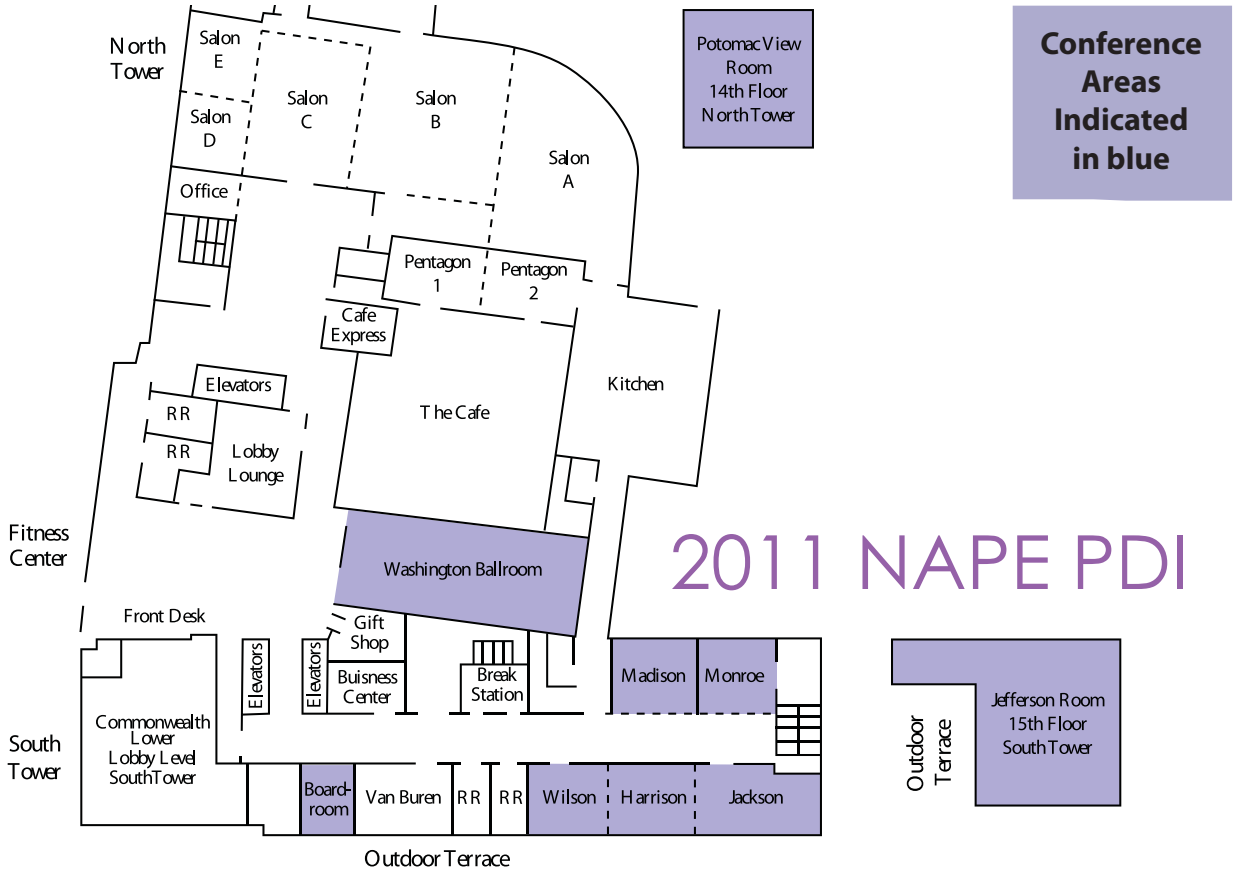
Anne Morris, Clemmons, NC

Barbara Orwig, Overland Park, KS

Raelene Sanders,Tacoma, WA

Jeff Weld, Cedar Falls, IA

Sandra Westlund-Deenihan, Schaumburg, IL



Shuttle

There is complimentary shuttle service from the hotel to the Metro.

The shuttle picks up outside the main entrance on the Lower Lobby Level on 11th Street and leaves for the Metro every 30 minutes. (Metro maps at the registration desk)

Taxi Services

Recommended by the Hotel
Red Top Taxi (703) 522-3333
Yellow Cab (703) 522-2222

Hotel address and Contact Information

300 Army Navy Drive,
Arlington, Virginia 22202
(703) 416-4100

Pentagon City Metro

Walking Directions from the Metro to the hotel:

- When you exit the Pentagon City Metro you will be on S. Hayes Street right in front of the Pentagon City Mall.
- Make a left onto S. Hayes Street. Pass the front of the shopping mall and walk along S. Hayes Street until you reach Macy's or go by Macy's, which faces Army Navy drive.
- Make a right onto Army Navy Drive and go three blocks. You will reach the Doubletree on the right hand side.
- This is about a 10-12 minute walk from the Pentagon City Metro Station to the Doubletree Hotel Crystal City.

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-Sandra Westlund-Deenihan, President, Quality Float Works, Inc.
Board Member, NAPE Foundation

Quality Float Works, Inc.

Sandra Westlund-Deenihan is the President of suburban Chicago-based Quality Float Works, Inc. - the premier manufacturer of hollow float metal balls and float assemblies in the nation. By harnessing her passion for manufacturing, Sandra elevated her family-owned small business into a global competitor. Under Sandra's leadership, the company's international exports have expanded to include locations throughout Asia, Canada, Europe, Latin America and the Middle East.

Sandra is committed to closing the skills gap in manufacturing with a special focus on supporting STEM initiatives in our classrooms and inspiring the next generation of women leaders.

To learn more about Quality Float Works, Inc., visit www.metalfloat.com | www.floatvalve.net

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National Alliance for Partnerships in Equity Education Foundation

Blueprint for Micromessaging to Reach and Teach Every Student

Teacher Professional Development Program

June 30, 2011

Table of Contents

Acknowledgements

The National Alliance for Partnerships in Equity Education Foundation would like to thank the following individuals and organizations for their contributions to this work to support every teacher and student and to make visible those issues and individuals in our classrooms that remain unseen today.

Contributors

Terryll Bailey, President, The Allison Group LLC

Tara Ebersole, Biology Professor and STEM Liaison,
The Community College of Baltimore County

Courtney Reed Jenkins, Expert Consultant, Gender Equity in Education and STEM Equity Pipeline

Jane Butler Kahle, Condit Endowed Professor Emerita, Miami University; Consultant, Ohio's Evaluation and Assessment Center for Mathematics and Science Education

Carolyn Parker, Assistant Professor, The Johns Hopkins University, School of Education

Tegwin Pulley, Diversity Consultant and Executive Director, High-Tech High Heels.

Jo Sanders, Expert Consultant, Gender Equity in Education

Maryland State Department of Education

Diana Bailey, Transition Coordinator, Juvenile Services, Education Program Branch

Marquita Friday, Lead Specialist, Career and Technology Education, Instructional Branch

Pat Mikos, Program Manager, Career and Technology Education,
Student and Assessment Services Branch

Katherine Oliver, Assistant State Superintendent, Division of Career and College Readiness

Luke Rhine, Specialist, Career and Technology Education, Instructional Branch

Linda Shevitz, Senior Educational Equity Specialist, Equity Office

The Multinational Development of Women in Technology (MDWIT, Inc.)

The Women of TI Fund

National Alliance for Partnerships in Equity Education Foundation Staff

Mimi Lufkin, Principal Investigator

Claudia Morrell, Co- Principal Investigator

Nancy Tuvesson, Research Associate

Expert Reviewers

Barbara Bitters, Assistant Director, CTE Team, Wisconsin Department of Public Instruction

Daniel Brown, Physics Teacher, Dallas Independent School District and
Gender Equity Professional Development Trainer

Catherine Didion, Senior Program Officer, National Academy of Engineering

Chris Lyons, State Director, CTE, Office of the State Superintendent of Education, Washington, D.C.

Nancy Null, Co-Director, MSDE IT Program Affiliate, Towson University

Ruta Sevo, Diversity Consultant, Momox.org

Funded by the National Science Foundation HRD-0734056

Executive Summary

The National Alliance for Partnerships in Equity Education Foundation (NAPE-EF) has created the following ***Micromessaging to Reach and Teach Every Student Blueprint*** for a high-quality research-based educator professional development program to address gender- and culturally based implicit biases that occur in the classroom and that are manifested through "micromessages." The ***Blueprint*** lays the foundation for a unique program that will provide participants with an awareness of the power of micromessages (small, subtle messages, sometimes subconscious, that are communicated between people, often without saying a word). These messages include looks, gestures, tone of voice, or the framing of feedback that subtly yet powerfully shape our culture, our classrooms, and the individuals within them. The ***Blueprint*** provides the framework for the creation of curriculum and method of delivery that will include the rich content and pedagogical tools needed by educators to *transform their practice*. The following are the four key components that are unique to this program:

1. A data-driven process for teachers and faculty that begins with the collection of quantitative and qualitative data and ends with the adaptation of a well-respected process for classroom-based continuous improvement.
2. The requirement of two (or more) teachers/faculty within a school identified prior to entry into the professional development and supported by the school-based leadership to ensure that learning is embedded within the institutional culture and supported by the community of practice.
3. A year-long professional development process to promote strategic, sustainable transformation.
4. A virtual, peer-supported learning community to promote learning and continuous improvement.

NAPE-EF feels strongly that this program is needed, long overdue, and critical to meet both the national need for a high-quality STEM workforce and to ensure that underrepresented students, and particularly women, benefit from the high-tech, high-paying jobs of the 21st century. The key elements of the teacher/faculty professional development will be as follows:

1. Modular courses that incorporate customizable online and/or classroom training based on educator need and budgetary constraints for short-term interventions or year-long engagement.
2. Integration of effective practices for continuous improvement, utilization of supportive learning communities of teachers/faculty, and integration of extensive resources and tools.
3. Graduate credit and/or continuing education units upon completion to provide value to educators for professional advancement.
4. The integration of national standards for teacher/faculty professional development and national standards for online course delivery.
5. Sustainable revenue from marketing full training and/or online modules as stand-alone courses.

As part of the process for creating the ***Blueprint,*** NAPE reviewed *many* teacher/faculty professional development programs with similar goals. This review identified programs that focused on gender, race/ethnicity, culture, or a broader audience of students. Programs targeted both informal and formal education, but they tended to focus on recruitment and retention rather than performance, did not adequately address the current research around micromessages, implicit bias, brain research, disabilities, and gender roles, and failed to target specific STEM fields. The ***Blueprint*** lays a foundation to address these issues.

Setting the Stage: A New Gender Equity Professional Development Program

In February 2011 the *Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century* was released through Harvard School of Education.[1] It received much praise across the nation by business and education alike. The premise was that offering students more engaging curriculum and more pathways to careers would encourage more students to succeed in school. This approach addressed some of the concerns students expressed in the 2006 report *Silent Epidemic: Perspectives in High School Dropouts*.[2] Specifically, nearly half of students surveyed said a major reason for dropping out was uninteresting classes. Nearly 70% said they were not motivated to work hard, although why they were not motivated was unclear. The assumption is that the curriculum or programs of study are not interesting or engaging enough. Perhaps the final statistical category provides a clue to the accuracy of that assumption. Many dropped out for personal reasons, including needing a job (32%), becoming a parent (26%), or caring for a family member (22%). Although teachers and faculty are expected to deliver high-quality subject content in hands-on, engaging ways, they are often unprepared for the student who is working two jobs, is struggling with a new baby, or comes from a culture where family needs come before educational aspirations.

The *Pathways to Prosperity* report also highlights women's increasing enrollment in colleges and universities (57%), but provides no context for what this means on the campuses or in the classroom. An ETS research report indicates that although women make up an increasing percentage of the college campus population, they tend to cluster in majors that lead to lower paying fields.[3] A number of factors have been highlighted to explain women's lack of engagement in high-tech courses and programs, including the pervasive, yet often unconscious gender bias that remains in our classrooms and workplaces and are conveyed through unconscious words and behaviors.[4]

Today, educators are expected to be aware of a widening number of socioeconomic, ethnic, demographic, and ability-based issues to be able to reach and teach every student. Yet most secondary teachers and college faculty spend their professional development hours on improving their disciplinary content knowledge and are unaware that they deliver their content through nonverbal as well as verbal communication with the subtle and often unconscious biases that pervade our culture. These communications, which can be an accumulation of facial expressions or choice of words, can discourage student participation without the educators' awareness. These small communications, also known as micromessages, are the vehicle through which we convey positive and negative biases.

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[1] Available at http://www.gse.harvard.edu/news_events/features/2011/Pathways_to_Prosperity_Feb2011.pdf. Accessed 6/11/2011.

[2] Bridgeland, J., J.J. Dilulio, and K.B. Morison. 2006 (March). *Silent Epidemic: Perspectives in High School Dropouts*. A report by Civic Enterprises in association with Peter D. Hart Research Associates for the Bill & Melinda Gates Foundation. Washington, DC: Civic Enterprises, LLC. Available at http://www.civicenterprises.net/pdfs/thesilentepidemic3-06.pdf. Accessed 6/11/2011.

[3] Coley, R. 2001 (February). *Differences in the Gender Gap: Comparisons across Racial/Ethnic Groups in Education and Work*. Educational Testing Service. NJ: Policy Information Center.

[4] Hill, C., C. Corbett, A. St. Rose. 2010. *Why So Few, Women in Science, Technology, Engineering, and Mathematics*. Washington, DC: American Association of University Women.

Micromessaging to Reach and Teach Every Student is intended to increase the academic performance and retention through program completion of significantly more female students of diverse backgrounds (race/ethnicity, socioeconomic status, and disability) in Science, Technology, Engineering, and Mathematics (STEM) career areas, including Career and Technical Education (CTE) programs of study. The program targets both secondary and postsecondary STEM courses and programs, areas where girls and women remain significantly underrepresented. The research-based professional development program for teachers/faculty integrates the research on micromessages and micro-inequities (small, subtle conscious or unconscious acts that convey—by looks, gestures, words, or tone of voice—differences among students that may be related to group characteristics, such as gender, race/ethnicity, economic status, etc.[5]) and effective instructional practices for girls in STEM-related programs of study to achieve the goal.

Micromessaging to Reach and Teach Every Student is a *teacher/faculty* professional development program for STEM educators, primarily targeted to secondary educators and community college faculty to address issues of equity in gender across race, ethnicity, socioeconomic status, and ability. The year-long action research program is interactive and provides a professional learning community of peers and access to equity experts. As participants *learn*, they should also be *transforming* their classrooms to meet the learning needs and styles of all students. The focus of this equity institute is on the domain over which classroom teachers/faculty have control: the learning environment, curriculum, and instruction. Relevant and related instructional materials regarding other domains (for example, family and society) will be available to the participants as a recognition of the multiple roles they play in the lives of their own families and communities and to further deepen their understanding of the complex nature of addressing equity in the classroom, school, community, and culture.

The *rationale* for this project arose from two vantage points. The first was an awareness of a teacher-training program developed by Jo Sanders in the Dallas Independent School District (DISD) and in nearby Plano Texas from 2003 to 2009, which was funded by the Women of Texas Instruments (TI) Fund. Workshops focusing on gender micro-inequities were given over a school year to a variety of groups including two successive groups of physics teachers, a STEM area of interest to NAPE. DISD data indicate a significant degree of improvement in the rate at which girls—and boys—passed AP Physics exams after the program as compared to before it. (Note: Physics is often seen as a gateway course to engineering and other rigorous STEM careers, which is why student, and particularly female, success in this course is so important.) The DISD program, called High Tech High Heels, was a promising practice as evidenced by the following data.

- ***Pre-program AP Physics exams pass rate 2000-2002: 12% for girls and 45% for boys***
- ***Post-program AP Physics exams pass rate 2007-2009: 41% for girls and 59% for boys***
- ***Three times as many girls are taking the AP Physics test as prior to the program***
- ***The number of Hispanics passing AP Physics exams doubled (28 to 56) between 2005 and 2009***
- ***The number of African Americans passing AP Physics exams quadrupled (5 to 19) during the same period.***

[5]Sandler, B. 1986. *The Campus Climate Revisited: Chilly for Women Faculty, Administrators, and Graduate Students.* Washington, DC: Association of American Colleges.

Concurrently, NAPE-EF was delivering a National Science Foundation (NSF)-funded Five-Step Program Improvement Process for administrators in education and state educational agencies in eleven states (HRD-0734056). NAPE-EF found that many state agencies complained that the current training available was not sufficient to transform the pedagogy and instruction in classrooms in STEM programs of study, leaving high-need and under-represented groups underserved. Teachers and faculty were willing to try new ideas, but they had neither the expertise nor a clear practice on how to develop and deliver what was needed to attract and retain top female talent among diverse students.

Micromessaging Program Goal and Objectives

The goal of the ***Micromessaging to Reach and Teach Every Student*** is to increase the academic performance and retention through program completion of significantly more racially and ethnically diverse female students in STEM programs of study by providing a professional growth opportunity for community college faculty and secondary teachers that will improve classroom pedagogy and instruction. The following objectives support this goal:

Objective 1: Enhance teacher/faculty knowledge concerning girls' and women's underrepresentation in STEM programs of study and careers and the influence of micromessages in that outcome, such that the teacher/faculty is able to explain the research concerning female underrepresentation in these fields.

Objective 2: Improve teacher/faculty understanding of the differences among diverse groups of female students of all backgrounds and economic levels, such that teachers/faculty are able demonstrate through discussion, demonstration, and/or assessment an improvement of their pedagogical skills in teaching through micromessaging.

Objective 3: Facilitate and support educator's classroom implementation of research-based activities, resources, pedagogy, and instruction, such that females' participation, performance, retention, and/or completion of STEM courses will measurably improve.

Objective 4: Develop and formalize teacher/faculty collaboration to sustain the impact of the professional development through Teacher/Faculty Learning Communities within schools and/or districts to improve classroom transformation and continued engagement with gender equity issues as demonstrated through peer coaching activities and virtual learning community participation over one year.

The goal and objectives will lead to the following outcomes:

Outcome One: A set of high-quality, research-based instructional materials for teacher professional development in gender equity in STEM that can be customized for delivery anytime and anywhere.

Outcome Two: A measurable number of teachers receiving professional development such that each state has a STEM community of practice focused on and familiar with gender equity research among their faculty and teachers who can provide peer coaching and advising to increase the academic achievement of girls in STEM.

Outcome Three: A set of tools and activities to use in the classroom to support student recruitment and performance outcomes, conduct action research, provide course assessment for continuous improvement, and ensure overall evaluation.

Outcome Four: Discipline- and/or school-/campus-specific teacher/faculty learning communities to ensure long-term sustainable efforts.

These objectives and the resulting outcomes will transform teacher/faculty practice and student outcomes.

The Need for Current, Research-Based, Gender Equity Teacher/Faculty Professional Development

There is a growing need for the development of this program to address critical economic and workforce challenges as highlighted here:

- **Ongoing Gender Stereotype/Bias**—Although there is sometimes a perception that gender bias no longer exists in our society, extensive data demonstrate that ongoing disparities have remained virtually unchanged since 1981.[6] In fact, selected STEM careers (such as pre-engineering and information technology) remain stubbornly resistant to engaging women fully.[7]

- **Disproportionate Participation**—Although the gap is closing in the number of boys and girls taking math and science courses and programs, women continue to be underrepresented in STEM fields such as engineering and computer science.[8] There continues to be a labor gap in skilled trades as well—both in the context of female participation and general availability of a prepared workforce. Ensuring women and men enter into nontraditional educational pathways in CTE is key to addressing labor gaps.[9]

- **Lack of Student Interest**—U.S. students demonstrate less interest in STEM fields relative to students in other countries.[10] Research shows that educators have a significant impact on

[6] ICPSR. *Gender in STEM Education: A Data-Driven Learning Guide*. Available at https://icpsr.umich.edu/icpsrweb/ICPSR/OLC/guides/genderSTEM/sections/a04?answers=yes. Accessed 3/22/11.
[7] Available at ftp://ftp.bls.gov/pub/special.requests/lf/aat11.txt. Accessed 3/22/11.
[8] Hill, C., C. Corbett, A. St. Rose. 2010. *Why So Few, Women in Science, Technology, Engineering, and Mathematics*. Washington, DC: American Association of University Women.
[9] Organisation for Economic Co-operation (OECD). *Learning for Jobs*. Available at http://www.sourceoecd.org/education/789264082236. Accessed 3/22/11.
[10] Report to the President, Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future. Executive Office of the President, President's Council of Advisors on Science and Technology, September 2010. Prepublication version available at http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-stemed-report.pdf. Accessed 3/22/11.

students' career choices, second only to parents;[11] and earlier the exposure to career possibilities increases the likelihood of choosing a nontraditional career.[12]

- **Limited Research-based Implementation Strategies for Females**—Few of the current strategies to address gender integrate the nuances of gender across multiple demographics, such as race, age, ability, and socioeconomic status, as well as multicultural elements.[13]

- **Lack of Diverse Project-based Learning Content**—A recognized challenge by the authors of this document is the lack of material that connects content experts in gender issues, experts in STEM content, and experts in teacher/faculty professional development. The result has been instructional materials rich in gender-based research but lacking the connection to the culture of the science classroom and the specific application-based tools relevant to a discipline.

On November 23, 2010, President Obama launched "Educate to Innovate," a nationwide effort to help reach the administration's goal of moving American students from the middle to the top of the pack in science and mathematics achievement over the next decade by improving the participation and performance of America's students in STEM. This campaign has included efforts not only from the federal government but also from leading companies, foundations, non-profits, and science and engineering societies to work with young people across America to excel in science and math. The administrations "Educate to Innovate" campaign has three priorities:

- Increase STEM literacy so that all students can learn deeply and think critically in STEM.
- Move American students from the middle to the top of the pack in the next decade.
- *Expand STEM education and career opportunities for underrepresented groups, including women and girls.*

To operationalize this goal, NAPE along with two other national non-profit education organizations initiated a meeting in Washington, D.C., on July 19, 2010. The goal was to leverage the best information possible, based on sound research and effective practices, to identify the top priorities to address the problem area of girls and women in STEM education. The recommendations were based on the opinions of organizations closest to the issue, with input from the wider community of practice. More than 350 organizations and individuals provided input through electronic brainstorming and an in-person meeting.

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[11] Ferris State University. *Decisions Without Directions*. Available at http://www.dcsc.org/STC/WIA/Documents/Decisions%20Without%20Directions.pdf. Accessed 4/6//11.

[12] Miller, L., and R. Hayward. 2006. New jobs, old occupational stereotypes: Gender and jobs in the new economy. *Journal of Education and Work, 19*(1), 89.

[13] Reha, L., for the National Alliance for Partnerships in Equity. 2009. Nontraditional Career Preparation: Root Causes and Strategies. Available at http://www.napequity.org/foundation/e107_images/custom/Root.causes.strategies9.18.09.09[1].pdf. Accessed 6/21/11.

Following the meetings, the Girls in STEM Collaboration issued a report.[14] The top recommendation was as follows:

> ***Help educators change their interactions with students to engage and motivate all students,*** *by learning and acting to dispel stereotypes, build self-efficacy and confidence in students, change the classroom climate for underrepresented students, and change the mindset of everyone that these talents can be learned by many, not few. Research on bias and discrimination, the effects of stereotypes on test scores, the relationship between attitudes and interest in STEM—should be incorporated in pre-service and in-service professional development of teachers/faculty. Sensitivity and skills related to multi-cultural and gender dynamics should be incorporated in professional standards.*

Building Current, Research-Based, Gender Equity Teacher/Faculty Professional Development

NAPE's three-year strategic plans, completed in 2010, were in alignment with this nationally recognized priority and its work through the STEM Equity Pipeline Project (HRD-0734056). NAPE submitted a supplement request to the NSF's GSE Extension Services to develop a ***Micromessaging to Reach and Teach Every Student Blueprint.*** The scope of the original project is to:

1. Build the capacity of the formal education community to implement research-based approaches proven to increase the participation and completion of females, including those with disabilities, in STEM education,
2. Institutionalize the strategies implemented by connecting the outcomes to existing accountability systems,
3. Broaden the commitment to gender equity in STEM education.

With full support from the Maryland State Department of Education (MSDE), NAPE requested funding to further explore, develop, and study an innovative approach that holds the promise of directly increasing girl's recruitment, academic performance, and retention in STEM and CTE courses and programs. Increased teacher/faculty awareness of culturally based micromessages and the concomitant positive attitudinal and behavioral shifts that result from their participation in professional development training will enhance teacher/faculty performance in the classroom and positively transform the learning experience for every student to be more welcoming, engaging, interesting, and supportive.

The supplement provided the leadership team with the time and resources needed to identify all needed research, partners, programs, and processes to develop a ***Micromessaging to Reach and Teach Every Student Blueprint*** ready for local delivery and national dissemination.

[14] Recommendations from a July 19 Convening to Shape Recommendations to the EDUCATE TO INNOVATE CAMPAIGN to Increase the Participation and Performance of Girls and Women. Available at http://www.stemcollaboration.org/. Accessed 4/14/11.

Addressing Micromessaging in Professional Development

Most efforts to date to increase females in STEM education leading to STEM careers have targeted girls and women rather than teachers/faculty as the change agents, and as a result may have failed to address the micro-inequities that are often subtly and unconsciously sent to and absorbed by girls or others about their supposed unsuitability for technical careers. Without awareness, educators, parents, and other adults may inadvertently discourage girls, women, and other underrepresented students in the classroom from rigorous STEM career fields. *A cultural bias about STEM has led to micro-inequities that influence female and minority students to avoid the field, or if attempted, to drop out to avoid the perceived failure.* This same principle also applies to men in health fields and to women in the trades. Much research over the past 50 years has focused on the role of self-concept or self-efficacy in mediating the effects of peers, family, learning experiences, and ability on career-related outcomes.[15] According to MIT researcher and professor, Mary Budd Rowe, an important influencing agent on a person's self-efficacy is the *micro-inequity*.[16] Dr. Bernice Sandler describes the micro-inequity as the way in which individuals are "singled out, or overlooked, ignored, or otherwise discounted" based on an unchangeable characteristic, such as race or gender.[17] A micro-inequity can take the form of a gesture, different word choice, treatment, or even tone of voice. Dr. Rowe believed that these behaviors and the subsequent perceptions are deeply rooted and unconscious and that the cumulative effect of micro-inequities has been demonstrated to impair a person's performance in the workplace or classroom because of the damage to the individual's self-esteem.

Definitions

Micromessages: Small, subtle messages, sometimes subconscious, that are communicated between people often without saying a word. These messages include looks, gestures, tone of voice, or the framing of feedback.

Micro-affirmation: Positive, powerful micro-messages contribute to feeling valued and belonging.

Micro-inequities: Negative micro-messages devalue, discourage, and ultimately impair performance in school. Often the absence of a positive message is in essence a negative message.

As part of the process of creating the ***Micromessaging to Reach and Teach Every Student Blueprint*,** NAPE reviewed the following teacher/faculty professional development programs with similar goals. Here are a few high-quality examples:

The Center for Culturally Responsive Teaching and Learning (CCRTL)[18] defines culturally responsive teaching as using the cultural knowledge, prior experiences, and performance styles of diverse students to make learning more appropriate and effective for them; it teaches to and through the strengths of these students. CCRTL's institutes, workshops, seminars, school site-based training, and individual coaching activities are designed to assist schools and districts in reaching its professional development and student achievement goals by promoting culturally appropriate instructional strategies for all students but in particular African American and Latino students.

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[15] Bandura, A. 1997. *Self-efficacy: The Exercise of Control.* New York: Freeman.

[16] Rowe, M.B. 1990. Barriers to equality: The Power of subtle discrimination to maintain unequal opportunity. *Employee Responsibilities and Rights Journal*, *3*(2),153-163. (Revised and extended from a series of papers called "Saturn's Rings" and "Glass Ceiling.")

[17] Sandler, B. 1986. *The Campus Climate Revisited: Chilly for Women Faculty, Administrators, and Graduate Students.* Washington, DC: Association of American Colleges.

[18] Gay, G 2000. *Culturally Responsive Teaching: Theory, Research, & Practice.* New York: Teachers College Press.

The National Institute for Women in Trades, Technology and Science (IWITTS)[19] has conducted more than 100 contract workshops for clients from school districts and state departments of education to individual community colleges and four-year universities in 43 states. IWITTS is well known in addressing issues of recruitment and retention, particularly in the trades, and provides web-based resources, such as pod casts and webinars to support its workshops.

Generating Expectations for Student Achievement (GESA)[20] is a commercially available curriculum that provides a high-quality workshop to educational personnel to increase student achievement and retention. The program, which benefits both female and male students, is a synthesis of research and experiences drawn from hundreds of studies, observations, and interviews with those working in instructional K-16 environments, especially in diverse settings and with nontraditional students.

State agencies, such as Illinois and Hawaii, have also created gender equity curriculum specific to their states needs (Illinois Gender Equity Training Curriculum for Pre-Service Teachers; Illinois Gender Equity Training Curriculum for School Counselors; Hawaii Office of CTE Tools for Learning).

More recently, faculty from the University of Virginia have developed workshops for high school computer science teachers/educators to increase the numbers of girls in their classrooms. The Teachers Attracting Girls (TAG) workshop provides teachers with recently developed National Center for Women and Information Technology (NCWIT) materials "In a Box" that are also publicly available. Their early data results have demonstrated some very promising recruitment outcomes.

Foundational Research-Based Effective Practice

Micromessages and Gender Bias

As mentioned above, Mary Rowe coined the term "micro-inequity" as part of her scholarly research on the power of subtle communication. That work has been adopted by and adapted for the business community.[21] Stephen Young, a leading consultant and trainer in the application of micromessaging awareness for improving leadership skills, has found that "the effective use of micromessages by leaders lies at the core of what inspires followers to follow."[22] Within the education system, Young believes that schools are at the epicenter for cultural transformation. "If we can get teachers to recognize the power they hold in their hands, in the way they teach and relate to students, they can be a powerful catalyst for change."[23] Young further theorizes that the effective use of micromessages will allow teachers to "shake things up in their schools so that the inequalities in our system and our cultural prejudices will not continue in future generations."

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[19] Available at http://www.iwitts.org/. Accessed 4/6/11.

[20] Grayson, D.A., and M.D. Martin. 1997. *Generating Expectations for Student Achievement*. GrayMill. Available at http://www.graymill.com/gesa.html.

[21] Richard, S.W., and J. Councelman. 2005. Creating a culture for engagement. *Workforce Solutions Magazine*. PA: Towers Perrin.

[22] Young, S. 2007. *Micromessaging: Why Great Leadership is Beyond Words*. New York: McGraw Hill. p. 3.

[23] Young, S. 2007. *Micromessaging: Why Great Leadership is Beyond Words*. New York: McGraw Hill. p. 170.

An extensive review of the research on bias and assumptions developed by the Women in Science & Engineering Leadership Institute, University of Wisconsin-Madison, documented the impact of biases that can negatively affect the evaluation of an individual's verbal skills, leadership skills, and job performance, based on race and gender rather than individual performance. In all cases, the subjects' bias was implicit or unconscious and consequently the people were unaware of the impact of their messages on others. The research also highlighted the impact of biases on academic achievement, hiring, and selection processes. The gender of the evaluator was not significant, indicating that both men and women share and apply the same assumptions and biases about gender.[24]

A key architect of the seminal research on gender schemas, Dr. Virginia Valian, documented the unconscious gender biases that exist within us all. Her landmark book, *Why So Slow?* supported the work of Dr. Rowe and others by providing direct evidence of unintended gender bias.[25] Dr. Valian's work demonstrated that the small, subtle messages we communicate and receive, often without awareness, accumulate over time to shape our cultural beliefs, assumptions, and biases. These beliefs will inform many of the decisions we make and micromessages we send.

Dr. David Sadker's and Dr. Karen Zittleman's most recent work, *Still Failing at Fairness: How Gender Bias Cheats Boys and Girls in School and What We Can Do About It,* builds on a body of work Sadker conducted with his wife Myra (since deceased) to document the continuing gender bias that still exists today. A key premise of the book is the prominence of the subtle signs, attitudes, and messages that still permeate the educational system in America. The lack of awareness and action has compromised education and short-changed both girls and boys by limiting their options and opportunities to learn.[26]

Despite more than 40 years of awareness and study, addressing gender and other forms of bias through the construction of micromessages has yet to be a major focus in the classroom. Although Dr. Rowe continues to champion the importance of her work[27] and many major companies, such as Apple, Bank of America, Cisco, BMW, and The Coca Cola Company, have brought the concept of micromessages into their organizations,[28] educational agencies and schools have not.

A recent publication titled *Why So Few* and released by the American Association of University Women (AAUW) provided a compendium of research identifying factors that influence women's decisions to enter and remain in STEM courses, programs, and careers. Having reviewed many research articles and reports, the authors concluded, "Encouraging more girls and women to enter these vital fields will require careful attention to the environment in our classrooms and workplaces and throughout our culture." This work will address the gap.

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[24] Women in Science and Engineering Institute, University of Wisconsin-Madison, 2006. *Reviewing Applications: Research on Bias and Assumptions.* Available at http://wiseli.engr.wisc.edu/docs/BiasBrochure_2ndEd.pdf.
[25] Valien, V. 1999. *Why So Slow? The Advancement of Women.* Cambridge, MA: MIT Press
[26] Sadker, D. ,and K.R. Zittleman. 2009. *Still Failing at Fairness: How Gender Bias Cheats Boys and Girls in School and What We Can Do About It*. New York: Scribner.
[27] Rowe, M. 2008. Micro-affirmations & micro-inequities. *Journal of International Ombudsman Association*, *1*(1).
[28] Young, S. 2007. *Micromessaging: Why Great Leadership is Beyond Words.* New York: McGraw Hill. p. viii.

Pilot Research

The instructional materials for this project are based on a teacher-training program developed by Jo Sanders in the Dallas Independent School District (DISD) and in nearby Plano, Texas, from 2003 to 2009, and funded by the Women of Texas Instruments (TI) Fund. The program, titled High Tech High Heels, provides five intensive workshops focusing on gender equity over a school year to a variety of groups, including two successive groups of physics teachers, a STEM area of national interest. DISD data indicate a significant degree of improvement in the rate at which girls—and boys—passed AP Physics exams after the program as compared to before it. DISD has 10 high schools (grades 10-12), and 9 physics teachers participated in training in either 2003 (5) or 2004 (4) from 9 of the 10 schools. Total physics teacher numbers were not provided. The focus of the small pilot was to increase student completion leading to test taking and improved performance on the AP Physics exam.

Table 1: Dallas Independent School District (DISD) Test Taking Data

AP Physics Test Taking Rates Averaged (B/C)	No. of girls	% of girls	No. of boys	% of boys
Pre-program, All teachers, 2000-2003	64	37.2%	109	63.3%
Participating teachers, 2004-2008	76	41.7%	106	58.2%
Non-participating teachers, 2005-2008 (not measured in 2004)	52	50%	52	50%
Post-program, All teachers, 2004-2008	128	44.8%	158	55.2%

The percentage change in course completion (measured as completing the course and taking the AP Physics exam) from pre-program to post-program was 20.4% for girls. In fact both participating and non-participating physics faculty experienced increased enrollment and completion numbers after the training. Anecdotal evidence suggests this is due to the creation of an informal teacher learning community among the small numbers of physics faculty that led to shared strategies for attracting women and other underrepresented students to their classes, thus benefiting all teachers with increased enrollment and completion rates.

Table 2: Dallas Independent School District (DISD) Pass Rate Data

AP Physics Passing Rates Averaged (B/C)	No. of girls	% of girls	No. of boys	% of boys
Pre-program, All teachers, 2000-2003	11	17%	38	35%
Participating teachers, 2004-2008	39	50%	67	63%
Non-participating teachers, 2005-2008 (not measured in 2004)	13	25%	27	52%

AP Physics Passing Rates Averaged (B/C)	No. of girls	% of girls	No. of boys	% of boys
Post-program, All teachers, 2004-2008	52	40.6%	94	59.5%

The percentage change in pass rates on the AP Physics exam from pre-program to post program for all teachers was 138.8% for girls and 70% for boys. For participating teachers versus non-participating teachers, the result was an improvement of 100% for girls and 21.2% for boys, suggesting that pedagogical improvements in the classroom and school will benefit all students, but that those teachers who participated in the training then taught students who demonstrated significantly higher academic achievement on the AP Physics exam compared to those that had teachers who did not participate in the training. The result was that a significant amount of the academic improvement in students can be explained by the gender equity professional development experience of the teachers.

As an outcome of the long-term success of the Dallas program, professional development in the DISD has expanded and is being delivered now by a male physics teacher who was a self-proclaimed skeptic in the original training.

The impressive results sustained over five years led NAPE-EF to adopt the curriculum as a foundation for developing the ***Blueprint***. NAPE recognized the need to update and enhance the original work done in Texas to broaden its diversity focus, ensure it met national standards for professional development, and validate the findings as a high-quality, teacher professional development program. Specifically, NAPE undertook a year-long investigation with teachers, state administrators, community college STEM faculty, web-based instruction experts, and multidisciplinary academic and business professionals to identify the elements needed to achieve the highest standards in content, process of delivery, and to develop the correct contextual elements for ensured teacher and faculty success. These include the following:

1. Integration of multicultural and crosscutting demographic elements by race, culture, economic status, ability, etc. within gender to create a spectrum of understanding of micro-inequities to ensure that the training is relevant for all students.

2. Standardization of activities into a formalized training structure that includes certification and attainment of continuing education credit for educators that complete training with excellence.

3. Addition of an electronic format to provide blended instruction and allow content experts to continuously improve the content as new research/findings emerge.

4. Creation of electronic resources and systems to provide a structure for the Teacher/Faculty Learning Communities, their coached peers, and other STEM teachers/faculty to access communication, resource distribution, online learning, and other electronic options and resources.

Professional Development in STEM Research

Teacher and faculty professional development in STEM has almost become de rigueur. Sifting through the myriads of content can be overwhelming, but like many fields of study, only a few resources provide

the high-quality foundation needed. In particular, the third edition of *Designing Professional Development for Teachers of Science and Mathematics* is a comprehensive book that addresses all elements of the professional development process, particularly as it applies to STEM fields.[29] And although the book addresses issues of equity, complementary publications contribute to and support this work, such as Dr. Davis's book, *How to Coach Teachers Who Don't Think Like You.*[30] These two resources served as additional framing of the curriculum to complement the support of Maryland State Department of Education professional development guidelines and the expertise provided by those acknowledged above.

Target Audience

The primary customers for this project are **public education professionals** in secondary and postsecondary education, particularly technical and community colleges. Teachers will be selected for the program through an application process. Minimal criteria for participation include having *two teachers/faculty per school* in order to facilitate the creation and sustainability of the learning communities and peer coaching. In addition, *leadership involvement* is required in order for educator learning communities to be effective. Teachers/faculty must have the support of the leadership to try new strategies in their classroom, carve out time for peer coaching, engage in on-line discussions, and generally benefit from all aspects of the program. To ensure this occurs from the beginning, a principal or dean must agree to support the program before participants are invited into the program. Faculty and teachers who helped develop this blueprint have made it clear that without the support of their chair, dean, or principal, they would likely fail in their efforts.

Program Features and Outcomes

The yearlong action research institute is interactive and provides a professional learning community of peers and access to equity experts. As participants *learn*, they are also *transforming* their classrooms to meet the learning needs and styles of all students. The focus of this equity program is to translate research into practice for STEM teachers/faculty.

Program Framework

The ***Micromessaging to Reach and Teach Every Student*** program aligns with NAPE's Five-Step Program Improvement Process™ (NSF HRD-0734056), which was developed and utilized to provide educators with the process needed to create their own customized strategy to achieve their project goals. This effective process has reached more than 12,000 educators since 2007 and is expanding to 11 states by 2012. Numerous pilot sites report results that show significant increases of women and girls in STEM-related programs of study and related outreach activities. The change model includes the following detailed steps:

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[29] Loucks-Horsley, S., K.E. Stiles, S. Mundry, N. Love, P.W. Hewson. 2010. *Designing Professional Development for Teachers of Science and Mathematics*. Thousand Oaks: Corwin.

[30] Davis, B.M. (2008). *How to Coach Teachers Who Don't Think Like You: Using Literacy Strategies to Coach Across Content Areas*. Thousand Oaks: Corwin.

- **Step 1: Document Performance Results:** The first step in the process is to describe state and school/college performance on the core indicators by comparing performance levels between schools/colleges, student populations, and programs over time. This step uses summary statistics and basic graphs and charts to document performance and identify improvement priorities.

- **Step 2: Identify Root Causes:** The second step is to analyze performance data and use additional information and methods to determine the most important and most direct causes of performance gaps that can be addressed by improvement strategies and specific solutions. This step encourages states to use multiple methods to identify and evaluate potential causes and select a few critical root causes as the focus of improvement efforts.

- **Step 3: Select Best Solutions:** The third step is to identify and evaluate potential solutions to performance problems, including both improvement strategies and program models, by reviewing and evaluating the underlying logic of these solutions and the empirical evidence of their effectiveness in achieving performance results.

- **Step 4: Pilot Test and Evaluate Solutions:** The fourth step is to conduct pilot testing and evaluation of solutions. This step presents practical yet rigorous methods and tools for evaluating solutions before full implementation at the state or institutional levels.

- **Step 5: Implement Solutions:** The fifth step is to implement fully tested solutions based on plans that evaluate the success of the solution in reaching the expected performance results. This step also addresses how to use evaluation results to plan the next steps in state and local improvement efforts.

While working in its 40 member states, NAPE collected data on current gender equity efforts and needs. It also conducted a survey of current CISCO Networking Academy and Project Lead the Way secondary teachers. (See Appendix 3.) Finally, NAPE conducted a survey of currently available gender equity training. The ***Blueprint*** is an effort to tease out the root cause areas that teachers/faculty need to understand to improve classroom performance and subsequent student performance. Recognizing that a one-day effort is insufficient for changing classroom culture, the ***Blueprint*** selected the following five phases as needed for classroom culture change. Initial work done by DISD suggests this program will be effective, but additional evaluation is needed.

The five phases are completed in 30 hours as follows:

- **Phase I: Data Collection and Analysis**—this phase allows teacher/faculty to collect classroom, school, and community-based data to customize the learning for their own experience. *~ 2 hours*
- **Phase II: Preparatory Content Knowledge**—this learning is to allow teachers/faculty an opportunity to get theory and research-based knowledge in small bites to digest and pedagogy and instructional strategies to try. *~ 5 hours*
- **Phase III Workshop to Deepen Learning**—this learning takes place in a face-to-face environment to deepen the teachers/faculty understanding and to create a learning community for collaboration and support. *~ 18 hours*

- **Phase IV: Capstone Action Research Project**—allows the participant to turn her or his learning into action in the classroom on a larger scale and evaluate the impact. *~ 3 hours*
- **Phase V: Implementation Plan for Continuous Improvement**—based on all the work to date, the teacher/faculty puts a well-tested plan into action in his or her classroom, school, or community. *~2 hours*.

Program Value for Teachers/Faculty

Two strategies were developed to engage and motivate teachers/faculty to participate and create sustainable engagement. First, the five phases can be adjusted to provide three credits (which can be between 30 and 45 seat hours depending on the requirements of the state) or one graduate-level course. The teacher survey conducted by NAPE demonstrates the importance of the professional development credit for teachers and faculty. While stipends are nice, professional credit either through the state agency or as graduate credit is essential to the programs sustainability. NAPE is pursuing graduate credit through The Johns Hopkins University School of Education at this time.

In addition, the program must align to the identity and values of the participants in the program. For this reason, teachers will be selected within regions, STEM disciplines, and even schools/campuses to create a strong, supportive, accessible cohort.

Phase I: Data Collection and Analysis

Participating teachers/faculty will collect local-level baseline data for their STEM career programs and courses, as well as for academic pre-requisite or gateway courses. All data will be disaggregated by gender, race-ethnicity, socioeconomic status, age, and disability. Participating teachers/faculty will learn how to analyze the data for gaps in performance and to discover leaks in the STEM pipeline for each disaggregated student population. This gap analysis will serve as the framework for the development of their deepening face-to-face workshop.

Student and teacher/faculty demographic data will allow for comparisons across groups, including; gender, race/ethnicity, age, native language, and disability status. All information will be collected online for pre- and post-assessment comparisons. Data to be collected include:

- Institutional/Student Data Collection (District, School and Classroom level)
  - Enrollment data
  - Test scores/achievement data
  - Completion data (course and program)
- Program Intervention/Strategies
  - Activities related to creating cultural awareness
  - Learning Community Activities—Peer observation of classroom behavior using a check sheet (See Appendix Two)
  - Additional data collected through the "Try It" sections during Phase II.
- Program Evaluation
  - Participant Feedback

- Outcome Measures

Phase II: Preparatory Content Knowledge

The underlying approach for Phase II is to provide modules that utilize the latest in Web-based training (WBT), an innovative approach to distance learning in which computer-based training (CBT) is transformed by the technologies and methodologies of the World Wide Web, the Internet, and intranets. Web-based training presents live content that can be modified and updated at the discretion of NAPE-EF's content experts. The structure of a WBT is that it is self-directed and self-paced instruction in any topic, although it can be modified to use either facilitated instruction or independent learning. WBT is made much more interesting with multimedia that are fully capable of evaluation, adaptation, and remediation.

Concurrent with the online learning will be a pedagogical "Try It" section, which will allow the teacher/faculty to gather additional information through observation, interviews, focus groups, environmental scan, surveys, and discussions with peers and students to create a better understanding of the root causes that occur, often unobserved or without full awareness, in the classroom or institution. This *mini action research* will be supported with survey instruments adapted from the *NAPE-EF STEM Equity Pipeline Root Cause*[31] analysis tools, among others available through NAPE's website.

The Preparatory Phase will include learning (also referred to as "teach") modules, which will provide research-based knowledge about the content and be accompanied by a classroom scenario. Scenarios will enable teachers/faculty to do the following:

- Deepen their understanding of micromessages and their impact in real-life scenario-based learning.
- Initiate discussions during the Phase III workshop about the various teacher/faculty classroom choices and their unintended consequences for underrepresented students in STEM.
- Apply and reinforce concepts learned in a risk-free environment.
- Evaluate their own understanding and application of concepts through action research.

Learning will happen by making the consequences of the teacher's/faculty's decisions evident within the context of the decision-making scenario. Because the setting of the scenario replicates the real-life setting of the target audience, the gap between the application of learned concepts and classroom realities is minimized.

Phases I and II will provide teachers/faculty time to collect, review, and analyze their own data and learn theoretical and factual gender equity content. This initial learning will allow the face-to-face workshop time to be used for meaningful discussions of the concepts learned by the participants, for an enhanced understanding of the educator's role in creating a classroom culture, and for building an effective Teacher Learning Community to support continuous improvement.

[31] Available at http://www.stemequitypipeline.org/Resources/TheFiveStepProgramImprovementProcessTrainingResources.aspx.

Phase III: Face to Face Workshop

During Phase III, participants will meet face-to-face for the equivalent of three days. The goal of the face-to-face workshop is to integrate research learned in Phases I-II into the design of a cohesive action research project, which participants will implement and evaluate during Phases IV and V. Please note that while the format is provided in terms of three days, the days can be split into three one-day sessions, or one day and a series of monthly meetings for two to three hours each. The goal is to have a customizable format that can be adapted to school district and college campus requirements without losing content or fidelity.

The workshop will include an online component that provides templates to enable teachers/faculty to come up with their own individual plans to overcome micro-inequities and add micro-affirmations in their classrooms. The learning happens by making the consequences of learner's decisions evident within the context of a decision-making scenario provided during the workshop. By providing access to peers, tools for gathering and analyzing data, and a process to evaluate pedagogy, the teachers/faculty will be better able to assess the impact of the change.

The trainer can review these strategies and provide feedback at the end of the workshop or even later. Activities can be also moved to the online medium, so that the necessity to print and distribute handouts is eliminated. Collecting, collating, and analyzing other similar information also becomes easier for the trainer using the online medium.

Day 1-2: Data Analysis and Root Cause Analysis

Objective:

The workshop is presented as a three-day event, but in fact, the days could be customized by topic area into smaller units for after school, weekend, or web-based training. The outline provided here is meant to provide a broad brush stroke for program delivery, but the specific implementation will be customized for each cohort.

The focus for Day 1 is on analyzing the data collected in Phase I to inform the process for each participant, presenting lessons learned from Phase II learning, deepening discussions on root causes, and building their learning community. Educators will integrate what they learned in Phases I and II to begin to draw some emerging hypotheses regarding the underrepresentation of women and other students in their STEM classes and schools. Through case study presentations, scenarios, individual reflections, group discussions, and content analysis, participants will identify and prioritize their root causes for the underrepresentation of girls in their STEM classes and schools.

Participants will:

- Present analyses of their data aligned with learning from Phase II.
- Deepen their discussion on the root causes to form hypothesis based on supporting evidence.
- Provide critical, research-based feedback during case studies and scenario enactments.
- Prioritize personal strategies for Phase IV Capstone

DAY 1	
8:30	Icebreakers and Cohort Building
10:30	Break
10:45	Presentations Analysis from Phase II Learning
12:00	Lunch
12:45	Small Group Discussions from Presentations
2:30	Break
2:45	Deeper Learning and Group Discussion—Micromessages in the Culture
3:45	Introduction of Strategy Scenario I—Think, Pair, Share
4:30	Group Reflections and Discussion from Scenario Experience
4:50	Introductory Session for Action Research
5:15	Evaluation

DAY 2	
8:30	Icebreakers
9:00	Review of Day I
9:30	Deeper Learning and Group Discussion—Micromessages in the Classroom
10:45	Break
11:00	Introduction of Strategy Scenario II—Peer Training and Assessment—Think, Pair, Share
12:30	Lunch
1:15	Transformation of Practice: Methods to Create Effective Strategy Mapping
3:45	Break
4:00	Introduction of Self Assessment and Critique—Think, Pair, Share
4:50	Evaluation

Day 3: Designing the Capstone Action Research Project

The focus for Day 3 is to design the Capstone Action Research Project for Phase IV and Final Implementation for Phase V. Participants will identify research- and evidence-based strategies that align with their identified root causes based on initial thinking and group feedback. The participants will embed the strategies into the design of their Capstone Project. The process for doing an action research project will be explained.

Participants will:

- Review research- and evidence-based strategies to increase the number of female students in STEM classes, and closely align the research with the results of their data collection and root cause analysis.
- Design their Capstone (Phases IV and V), which focuses on the implementation of research- and evidence-based strategies in their schools and/or classes.
- Learn and apply principles of strong evaluation design to action research and other elements.

8:30	Icebreaker
9:00	Aligning Strategies with Data and Root Cause Analysis
10:45	Break
11:00	Designing Capstone Project—Cohort Building—Think, Pair, Share
12:45	Lunch
1:30	Designing for Strong Evaluation
3:15	Break
3:30	Designing Action Research for Capstone Project II: Reflections and Review
4:50	Evaluation

Phase IV: Capstone Action Research Project

The Capstone Project serves as a turning point in the professional development from predominantly learning theory to the full application of learning applied in the classroom. It is the final assessment of how well the teacher/faculty has understood the concepts and can now fully implement them in his or her classroom on his or her own. Although this ***Micromessaging to Reach and Teach Every Student is*** intended to support ongoing learning through the learning communities, the teacher/faculty shifts from being the participant learner to becoming a participant teacher by sharing his or her lessons learned from their action research project.

The focus of the Capstone is to implement the action research project developed in the workshop that will transform the classroom practice and result in improved student outcomes. Participants will have identified research- and evidence-based strategies that align with their identified root causes. The participants will embed the strategies into the design that will include opportunities for a reflective process of progressive problem solving (also known as action research), which can be shared with their learning community for feedback and support.

Participants will:

- Review research- and evidence-based strategies to increase the number of female students in their STEM classes, and closely align the research with the results of their data collection and analysis.
- Design their Capstone project, integrating action research if possible, and the implementation of research- and evidence-based pedagogical strategies in their schools and/or classes.
- Receive virtual feedback on a monthly basis from instructors and peers.
- Conduct micro- and macro-analyses of the results of their actions.
- Revise their pedagogical strategies and practices to achieve improved student outcomes in their classroom.

The Capstone will allow the following:

- Initiate discussions on the proposed strategies among the learning community and encourage deeper reading and understanding.
- Reinforce concepts and applications.

- Confirm whether the participants have grasped the concept by capturing the decision-making part of the process and providing online feedback as and when appropriate.
- Evaluate the participants on their performance related to the project concept.

The advantage of having a Capstone is as follows:

- It will help teachers/faculty apply the concepts, strategies, etc. that teachers/faculty have learned during their Preparatory Work and Workshop.
- It will give the teachers/faculty an idea of what to include in the full implementation plan and how to go about it.
- It will provide teachers/faculty with an opportunity to test their new strategies and resources and evaluate their effectiveness or lack thereof among a supportive learning community.

To the extent possible, faculty should have buy-in and be fully engaged in the development and implementation of their research action project. The ***Blueprint*** is not overly prescriptive in determining teacher/faculty interventions and hopes to encourage creativity in their choices. However, in order to better evaluate the effectiveness of the professional development program, affinity groups for the types of interventions that faculty may develop are provided. The affinity groups are subdivided into administrative, curricular, and pedagogical interventions. Administrative interventions are those that alter the overall structure of the room, schedule, or formatting of a course. Curricular changes are centered around course outcomes and how to achieve them through the use of text books, testing techniques, content materials, and references. Pedagogical interventions focus on the teaching styles and learning styles of the students. Below are some examples of the types of interventions that faculty may choose.

Administrative interventions:

- Change classroom décor.
- Provide courses at times more appropriate for women and minorities.

Curricular interventions:

- Change textbook.
- Revise course Power Points.
- Rework word problems.
- Provide additional and appropriate classroom resources.
- Increase frequency of class-level assessment.
- Connect curriculum to service learning.
- Modify course objectives and/or requirements

Pedagogical interventions:

- Incorporate teaching best practices such as cooperative learning.
- Accommodate learning styles geared toward individual differences.
- Develop learning options in a structured environment.
- Provide models of desired behaviors and skills.

Phase V: Implementation Plan

The focus for Phase V is for participants to report on the results of their action research projects and submit for review a fully formed Implementation Plan.

Participants will:

- Conduct micro- and macro-analyses of the results of their capstone action research.
- Identify commonalities among research findings.
- Plan to institutionalize locally the strategies that resulted in positive outcomes.
- Collaborate on dissemination of action research to broader STEM community.

The lessons learned during Phases I-IV are kept alive during this phase through the online program. Learners will revise and implement their fully tested solutions with input from the instructor and their learning community.

This element will be blended between virtual meetings and online support. Features of the online program component of the implementation plan are as follows:

- Implementation plans can be posted.
- Plans can be reviewed by peers and mentors, and suggestions can be made.
- Successful plans can be made available for other teachers/faculty.
- Teachers/faculty can comment on the effectiveness of various plans.
- Discussions boards enable teachers/faculty to seek advice and feedback from others in the community.
- The program provides a growing repository of resources.

The advantage of having an implementation plan: The teachers/faculty will be aware of the challenges they might face when implementing the strategies to address micro-inequities. They will therefore be better equipped to prepare an implementation plan for their school or college.

Equity in STEM Content Integration

The work of Loucks-Horsley et al.[32] was used as a guide to construct a strong bridge between theory and practice in gender equity, STEM education, and professional development and the desired state for teaching and learning these subjects. Their professional development design framework served as a useful tool for framing discussions and ensuring the team captured all important inputs. The development team considered seven factors for ensuring a successful, sustainable model: (1) building national capacity; (2) integrating enough time for professional development to affect learning and practice; (3) developing the peer teams as leaders in their respective classrooms, institutions, and communities; (4) ensuring equity among participants and their beneficiaries (students) as a core principal; (5) building a professional learning community; (6) garnering public support for funding and other resources; and (7) building in the

[32] Loucks-Horsley, S., K.E. Stiles, S. Mundry, N. Love, P.W. Hewson. 2010. *Designing Professional Development for Teachers of Science and Mathematics,* 3rd. ed. Thousand Oaks: Corwin.

ability to scale up while maintaining fidelity.

Teacher professional development in areas of equity has historically been developed by experts in diversity and equity as it relates to one or two areas, such as gender, culture, ability, etc. ***Micromessaging to Reach and Teach Every Student Blueprint*** is intended to support teachers'/faculty's ability to attract, retain and increase performance outcomes for a wide diversity of underrepresented students, and particularly females, in STEM careers. This also includes STEM-related CTE, including Project Lead the Way and Cisco Learning Academies. To achieve this, experts in the content areas listed below will first construct the initial content.

Once each unit is developed, selected STEM teachers/faculty, who have been recognized as experts among their peers, will be invited to work with the content experts to develop **project based learning** examples and strategies for the "Try It" section of the Preparatory Phase and suggest project ideas for the Action Research Capstone Project that will appeal to females and underrepresented groups. STEM teachers/faculty will ensure the full integration of reality-based examples and strategies to ensure the ***Micromessaging to Reach and Teach Every Student Program*** complements and enhances to learning already taking place in the classroom. This will ensure the content is both meaningful and applicable to the teachers/faculty it serves.

Content Areas: Creating Awareness and Providing Classroom Strategies

Content is divided into two components: (1) creating awareness and (2) providing classroom strategies. Creating awareness refers to the development of teacher/faculty understanding and appreciation of cultural influences in U.S. society. While understanding these influences are necessary for contextual understanding, in some cases the teacher or faculty member may have limited ability to change these influences. However, teachers/faculty will also be given examples of how their efforts in the classroom can have a profound effect both inside and outside of the classroom and off the campus. Classroom and community-based strategies are provided in each lesson to deepen learning and facilitate improvements in instruction and pedagogy in the classroom where teachers can make a difference from day one of the content learning.

Introduction to the Course

1. **Rationale: Setting the Stage** will introduce the course and the concepts central to the course, including micromessages, gender equity and STEM, the Five-Step Program Improvement Process, and the role of the teacher in creating a classroom for learning.

2. **The Influence of Micromessages in our Culture** will introduce the concepts related to micromessages including micro-inequities and micro-affirmations, implicit bias, gender schemas, and the accumulation of (dis)advantage. Together these elements affect the culture and drive our beliefs and conscious and unconscious behaviors. Only by acknowledging our role in changing our own behaviors can teachers/faculty transform their classrooms to meet the needs of every student.

Biology

3. **Neuroscience Link to Learning** will introduce research-based knowledge about brain development by gender from prenatal influences to the adolescent brain. Beliefs about intelligence and cognitive science will be touched upon, and participants will be provided with selected reading to deepen their knowledge and interest.

Nurture in Family and Society

4. **Child Development and Family** will touch briefly on issues of early childhood, parental influences, and the importance of siblings in different cultures as they affect career choices, particularly around STEM.

5. **Larger Societal Issues** will address the influence of media and popular culture shaping STEM career choices, peers influence for boys and girls, and the difference in language and communication styles as they affect our ability to communicate

6. **The Intersection of Gender and Other Factors** will include the multi-factor approach to race, ethnicity, and gender and include considerations of economically disadvantaged students, the exponential growth of first- and second-generation English Language Learners, the emerging awareness of the importance of lesbian, gay, bisexual, and transgendered (LGBT) issues, and new knowledge related to gender and disabilities, all of which are issues for the students who enter our STEM classrooms and will need to be addressed to assure students' needs are met.

7. **Concepts That Influence Learning** will include self-efficacy and self-confidence as student attributes that teachers/faculty can influence through micro-affirmations. Attribution theory, stereotype threat, and academic proficiency are three areas where teachers/faculty will have the opportunity to deepen their understanding and crate strategies to reverse the impact of negative cultural influences.

8. **Career Development** will provide an opportunity for teachers/faculty to help students understand how information can help students think beyond traditional models about career planning and formation, how to identify and welcome role models, how to establish mentoring programs, and how to develop experiential learning opportunities and workplace perceptions

Instructional Material Format for Phase II and III

Phase II: Preparatory Content Knowledge

Unit Pretest

This simple and quickly completed pre-test will assess participant knowledge of the concepts to allow for an evaluation of the growth in knowledge and skills.

Unit Objective:

This unit will provide the expected outcomes for the participant, including what they will be able to do or know upon completion of the unit. For example, participants will understand the concepts of micromessaging, implicit social cognition theory, and gender schema, and how they affect the culture.

Unit Activities:

This unit will take the participant no more than one hour to complete including additional readings or other media.

- **Introduction to the Unit or Anticipatory Set:**
  This is an introductory activity that will engage the participants in the topic and assess their prior experience. This could be a set of pre-test questions to assess knowledge of the subject prior to starting the unit, reflective questions that can be answered using the online tools to create conversation between all students taking this unit, or a story, online video, website, short article, current event or other scenario that will draw the students interest.

- **Lesson**
  Lesson content may include questions, explanations, definitions, examples, readings, scenarios, and theoretical information or any other content that introduces the concept.

- **Diagrams or other Visuals**
  These will be used to illustrate concepts.

Check for Understanding

After reading and analyzing the examples and the theories, learners will be presented with a multiple-choice inventory, test, or survey to assess understanding. The tool will be developed that best serves the assessment goal. This could also be a simple list of questions requiring a response or a life-like classroom scenario that requires a response. Participants' will be provided feedback to enable the participants to continue to learn, ask questions, and modify responses.

Deeper Reading

This screen will contain links to resources that are suggested or required to be read by participants as well as seminal texts or foundational research that forms the basis for the unit. Participants may be asked to read assigned readings and answer questions. In addition, they may get to select three additional readings and complete a reader response from created questions.

Reflection Questions

At the end of the Unit, participants will be given discussion assignment questions for which they will post their comments to the discussion board.

Try IT

This screen will provide pedagogical effective practices and tools for teachers/faculty to use in the classroom right away! Feedback will be requested from the mini assignments.

Scenario (or Simulation if Web-Based Training is funded)

Introduction: The concept for scenario-based learning puts the learners in a situation or context, exposes them to issues, challenges, and dilemmas, and asks them to apply knowledge and practice skills relevant to the situation.

A real-life scenario is provided to the participant that would likely unfold in the classroom where the content of the unit has application. The teacher will be required to "address" this incident. The incident will require the teacher to make either a **fact-based** or a **conversation-based** decision. Fact-based decisions will entail the learners selecting the correct fact option from the set of options presented to them; while conversation-based decisions will require learners to select a conversation option from the set of options presented to them.

The simulation will provide:

1. A brief background of each student in the scenario.
2. Background and objectives as they relate to the lesson.
3. Student and classroom/lab information to frame the simulation development.
4. The situation or incident, which will replicate a challenge relating to gender bias that teachers/faculty are likely to face in the real life.
5. Three to five potential scenarios on how the situation might be handled from worst to best, although ambiguity may be involved as in real life.
6. Feedback on how the teacher handled the situation.

The scenarios would involve increasing levels of complexity, with the first and second having decision trees that lead to a right or wrong choice. This will allow the learner to become comfortable with the concept. But by the third scenario, the complexity of the situation will be less obvious, leading to some required thoughtful reflection and discussion opportunities through either an online medium or a face-to-face situation.

Phase III: Workshop

Workshops are face-to-face and will be a minimum of two hours in length or a maximum of three days. Workshop activities will build upon the knowledge obtained from completing Preparatory Content Knowledge prior to attending.

Unit Objectives

The expected outcomes for the participants beyond the outcomes from the Preparatory Learning.

Required Technical Resources

Computer, Microsoft PowerPoint, LCD projector, Access to Internet, Software for video and sound display, VCR Player, DVD Player, etc.

Introduction to the Lesson/Anticipatory Set

An introductory activity that will engage the participants in the topic and assess their prior experience. This will provide a deeper understanding from the initial preparatory content as some time will have elapsed since the participants completed the preparatory content. This activity will also help build community among the workshop participants and should be as interactive as possible.

Hands-on or Engaging Activities

Activities that illustrate the application of the theoretical knowledge obtained from completing the Preparatory unit. These activities should help the participants better understand what they learned from the online unit and create opportunities for them to apply what they learned through group work, hands-on activities, role-playing, or practice in their classrooms.

Each activity will include:

- Length of time required
- Materials needed: handouts, supplies
- Room layout
- Type of activity: independent learning, small group or large group participation
- Description of activities with complete detail for workshop presenter
- Assessment instrument to check for understanding or scoring rubric for evaluating participants success in implementing or participating in the activity

Key Take-away Point(s)

The most important points that the participants take away from participating in this workshop.

Additional Gender-based Strategies, Tools, Resources

Additional resources, classroom strategies, pedagogical applications application-based tools, or other supportive resources.

Suggested Action Research Projects

Participants will be asked to complete a small action research project that applies what they have learned in their own classroom. Suggested action research projects that apply to the content of this Unit will be provided here.

Teacher Learning Communities

Most efforts to provide faculty professional development on research-based effective strategies have been

delivered using traditional educational models with a lecture format. Learning communities, defined as a cohort of individuals who collaborate and actively contribute to interdependent growth, peer relationships, and learning goals[33] can aid in the professional growth of teachers. A *Teacher Learning Community* (TLC) is a relatively new practice, and although still evolving, experts agree that for professional development to have an impact on student performance, it must be focused and sustained.[34] Peer coaching is a small two- to three-person teacher learning community and professional development strategy for educators to consult with one another, to discuss and share teaching practices, to observe one another's classrooms, to promote collegiality and support, and to help ensure quality teaching for all students.

In the DISD project, the small number of teachers/faculty trained created an informal discipline-specific (physics) TLC that allowed teachers/faculty to share success and challenges, get new ideas, take risks, and maintain efforts for long-term sustainability and success. In the ***Micromessaging to Reach and Teach Every Student*** program, two teachers/faculty will be selected from each school or campus each year from 15 schools/colleges to create an optimal cohort of 30 teachers or faculty. These teachers/faculty will share several common traits or identities, including teaching a STEM or CTE discipline or program of study, being from a local community or single campus, and sharing a desire to continuously improve pedagogical and instructional practice as evidenced through a survey. Together, these elements will create the following opportunities:

1. *Teacher Learning Communities* (TLCs) will be developed for the initial face-to face training. These teams will be facilitated to work together on program-specific challenges and implementations, creating a supportive network of non-critical colleagues who can share successes and lessons learned for continuous improvement and sustaining efforts.

2. *Virtual Learning Communities* (VLCs) can form around programs of study, states, or content areas to form common-interest-based learning communities, discussions, and to network electronically via a listserv; post relevant articles, PowerPoint presentations, and documents; view live or archived webcasts and webinars; participate in online courses and tutorials; submit performance data for analysis; complete project evaluations; and submit suggestions for improvements. The VLC will be a public portal describing the project and posting relevant resources for the STEM equity community. All project activity and communication will be conducted within the private sections of the VLC.

3. *Peer Coaching* will be a requirement for all teachers/faculty for project inclusion. Training will be provided to each participant within the three-day training face-to-face professional development with the goal that each teacher will in turn become a supportive coach to at least two of their non-participating program peers or other STEM career teachers/faculty in their schools.

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[33] Doering, L. 2000. Effects of Learning Communities on the Academic Performance and Retention of Entering Undergraduate Students. Paper prepared for AERA 2000 annual meeting, New Orleans, LA. p. 3

[34] Holloway, J. H. 2003 (November). Research link/linking professional development to student learning. *Educational Leadership 61*(3). Available at http://www.webmediasolutions.com/actionlearningsystems/ab75/downloads/LinkProfDev.pdf. Accessed 10/11/10.

Program Evaluation Matrix Framework

This evaluation framework is designed using the major modules/sections of the **Micromessaging to Reach and Teach Every Student Program**, with the idea that it may be customized and implemented in full or in part. In addition, multiple methods for evaluation are provided to give options and ideas to evaluators, who may provide insight as they develop the particular evaluation plan appropriate for the manner in which the ***Blueprint*** is implemented. Sample questions are provided as reference only, and are intended to be examples and suggestions and not requirements.

The purpose of gathering the data suggested in this framework is to:

- Provide evidence that the program activities have been designed to meet the identified and ongoing needs of participants.
- Create awareness among participants of demographic, ethnic, and cultural dynamics occurring in their classroom and institutions and their ability to positively impact the data through their actions.
- Inform the content, design, and delivery of future trainings;
- Continuous improvement of the Program, training sessions, and evaluation;
- Demonstrate the overall impact of the Program and thereby validate Program goals and associated activities as a model worth replicating; and
- Verify and provide evidence that NAPE's ***Blueprint*** has had a measurable impact on teaching and learning in STEM classes.

Phase I: Data Collection – Aligned with Objective I			
	Sample Questions	Examples of Sources/Tools	What is measured
1.a Institutional/student data collection	What sources were used (classroom, school, district, state, etc.)? What types of data were collected (i.e. enrollment, test scores/achievement data, course/program completion data)? What challenges/barriers did participants encounter in collecting the data? What data seemed to be missing, and how essential is it to collect these missing data? Do participants believe they have greater fluency in the use of institutional/student data? What value did participants find in the data collection phase? What might the Program do to improve its presentation of institutional/data collection? How much have participants used institutional/student data in the past to evaluate effectiveness of classroom practices and student achievement? How effective were the instruments and procedures for data collection?	Participants • Review of participant documents • Post training surveys • Post training interviews • Focus groups	Effectiveness of program in teaching participants how to collect institutional/student data Ability of participants to collect institutional/student data Ability of participants to analyze data for understanding and to direct actions
1.b Peer observation of classroom behavior	What did participants learn as a result of being observed by peers? What did participants learn as a result of observing peers? How useful was the check sheet that was provided? What challenges/barriers did participants encounter in completion of the peer observation? How did participants use data gathered through peer observation?	Participants • Review of participant documents • Post training surveys • Post training interviews • Focus groups	Effectiveness of peer observation activities Degree to which peer observation objectives were met Retention and application of new knowledge and skills presented during cultural awareness activities

Phase II: Preparatory Content Knowledge – Aligned with Objectives I and II			
	Sample Questions	Examples of Sources/Tools	What Is Measured
2.a Web-based Training	The Training: Were the training objectives met? To what extent were individual learning styles recognized and accommodated by the training? To what extent did individuals demonstrate content learning? To what extent did participants use the "Try It" activities in their classrooms or within their organizations? To what extent did participants complete all activities provided by the Program accurately? To what extent did the participants understand the scenarios and provide appropriate responses to the questions? To what extent did participants indicate increased understanding of the issues that affect girls in STEM courses? To what extent are participants able to articulate issues related to the root causes for girls' lack of participation in STEM courses and women's careers?	Evaluator Observations • Checklists • Forms • Worksheets • Reflective notes • Pre and post tests	Effectiveness of WBT Degree to which training objectives were met Retention and application of new knowledge and skills presented during WBT training sessions
	The Training How do participants rate their confidence level in applying the content learned in a given unit/module/course? How do participants rate the effectiveness of the following: lecture, hands-on application, independent reading, and media (i.e. streaming video)? How do participants rate the quality of the course materials? Was there adequate access to equipment to achieve the stated course objectives? Did the order of topics aid in participant learning? If not, what changes are suggested?	Participants • Post training surveys • Post training interviews • Assessments of content/learning by participants • Focus groups	Effectiveness of WBT Satisfaction and participation levels of participants Retention and application of new knowledge and skills presented during WBT training sessions
	The Content: How well have participants learned the content related to each of the following topic areas? • The Influence of Micromessages in our Culture • Neuroscience Link to Learning • Child Development and Family • Larger Societal Issues	Pre and post test On-line discussion	Degree to which participants have learned the research-based content. Ability to instruct others in the content Ability to apply learning in action a research

Phase II: Preparatory Content Knowledge – Aligned with Objectives I and II			
	Sample Questions	Examples of Sources/Tools	What Is Measured
	• The Intersection of Gender and Other Factors • Concepts That Influence Learning • Career Development		
2.b "Try It" / mini action research	How clearly did participants understand how to gather additional information to create a better understanding of the root causes that occur in the classroom or institution? To what degree were participants able to align data with learning from Phase II? How effective were the survey instruments and analysis tools that were provided? What challenges/barriers did participants encounter in completing the pedagogical section? What did participants learn as a result of the "Try It" section?	Participants • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Assessments of content/learning by participants • Review of participant documents	Effectiveness of "Try It" / mini action research Satisfaction and participation levels of participants Retention and application of new knowledge and skills obtained through the "Try It" / mini action research section
2.c Use of scenarios	To what degree were the objectives of the scenario-based learning met? To what extent were participants able to engage in the scenarios in a meaningful way? To what degree were the consequences of participants' decisions made evident within the context of the decision-making scenario?	Evaluator Observations • Checklists • Forms • Worksheets • Reflective notes	Effectiveness of scenarios in enhancing participant learning
	How clearly did participants understand the research-based knowledge about micromessaging? How effective were the scenarios in deepening participants' understanding of micromessages and their impact in real-life scenario-based learning? How do participants rate their ability to apply and reinforce concepts learned through the use of scenario-based learning? What challenges/barriers did participants encounter in using the scenarios provided? What did participants learn as a result of their participation with the scenarios?	Participants • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Assessments of content/learning by participants • Review of participant documents	Effectiveness of scenarios in enhancing participant learning Satisfaction and participation levels of participants Retention and application of new knowledge and skills obtained through the use of scenarios for learning

Phase III: Face-to-Face Workshop – Aligned with Objectives II and III			
	Sample Questions	Examples of Sources/Tools	What Is Measured
3.a Data and root cause analyses	Workshop Observation: Are the workshop activities being implemented as planned? Are all participants completing all aspects of the workshop? What problems are arising during implementation? How are they resolved? Are the managerial services being performed well? Are resources adequate to implement the workshop as intended? What are the strengths of the workshop? What modifications are recommended to improve the workshop?	Evaluator Observations • Checklists • Forms • Observation worksheets • Reflective notes	Effectiveness of face-to-face workshop to the deepening of learning and the ability to apply that learning in the classroom.
	Content How clearly did participants understand how to connect data analysis and root cause analysis to application in their classrooms? How effective were the case study presentations and scenarios that were provided in deepening understanding and learning? What challenges/barriers did participants encounter in completion of the research-based feedback from other participants? How did participants use data gathered from the feedback? What did participants learn as a result of the feedback they received? What did participants learn as a result of providing feedback to others?	Participants • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Assessments of content/learning by participants • Review of participant documents	Effectiveness of face-to-face workshop in enhancing participant learning regarding data analysis and root cause analysis Participant satisfaction and participation levels Retention and application of new knowledge and skills obtained through training on data analysis and root cause analysis
3.b Peer coaching	What did participants learn from the training provided on peer coaching? What suggestions for improvement do participants have regarding training provided on peer coaching? What challenges/barriers did participants encounter in completing the peer coaching requirement of the Program (to become supportive coaches to at least two of their non-participating program peers or other STEM career teachers in their schools)? How many participants completed the peer coaching component of the Program? What did participants learn from participating in peer coaching?	Participants • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Assessments of content/learning by participants • Review of participant documents	Effectiveness of peer coaching training in creating a feeling of support and goodwill in their school. Satisfaction and participation levels of participants Retention and application of new knowledge and skills obtained through peer coaching

Phase IV: Capstone Project – Aligned with Objectives III and IV			
	Sample Questions	Examples of Sources/Tools	What is measured
4.a Design Capstone	How clearly do participants understand the principles of research- and evidence-based strategies? To what degree were participants able to align strategies with their identified root causes? What changes did participants make to the pre-workshop pedagogy/instructional practices in the classroom?	Participants • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Assessments of content/learning by participants • Review of participant documents	Effectiveness of face-to-face workshop in supporting participants to design the Capstone project Satisfaction and participation levels of participants Retention and application of new knowledge and skills obtained through designing the capstone project
4.b Application of concepts and strategies in the classroom	How were research- and evidence-based pedagogical strategies implemented in participants' schools and/or classes? How well do participants understand how to apply micromessaging in their teaching to increase the quality and effectiveness of learning? How well do participants understand how to design lessons that integrate micromessaging strategies into instruction and learning? How well did participants understand how to conduct micro- and macro-analysis of the results of their actions? In what ways did participants revise their pedagogical strategies and practices to achieve improved student outcome s in their classrooms? Be specific. How did participants evaluate the effectiveness of their new strategies and resources? How did their peers evaluate the effectiveness of their new strategies and resources?	Participants • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Assessments of content/learning by participants • Review of participant documents	Effectiveness of Program Satisfaction and participation levels of participants
	In what way did the new strategies impact students? To what degree did students want to advance their understanding of STEM and aspire to advanced work in STEM? To what degree do students enjoy STEM classes? What impact did the changes have on student cognitive/academic achievement? What impact did the changes have on student behavior (i.e., participation, attendance)? What impact did the changes have on student attitudes? What impact did the changes have on student aspirations?	Students • Tests • Performance tasks • Documents/records • Surveys • Observations	Effectiveness of Program Satisfaction and participation levels of participants

Phase IV: Capstone Project – Aligned with Objectives III and IV			
	Sample Questions	Examples of Sources/Tools	What is measured
4.c Action research	To what extent did participants integrate action research into their Capstone projects? How was action research used to chart the effects of implementation of a curriculum or strategy, to study student learning and responses, or to profile individual students? What did participants learn about what they are able to influence? How did action research influence the changes that participants made? What impact did the changes have on student learning and achievement? To what degree did the integration of action research provide the opportunity to work with others and to learn from the sharing of ideas? To what extent did the action research include student information, records and reflections from other participants, referral sheets, work log books and/or a journal or log book to keep track of insights, observations, anecdotes and questions, and reflections on the research process itself and other paperwork? To what extent did the action research include group brainstorming, talking circles, or discussion groups with participants and/or other stakeholders? To what extent did the action research include in-depth individual or group interviews, using open-ended questions that allow diverse experiences and perspectives to emerge? To what extent did the action research include statistics and surveys? To what extent did the action research include naturalistic observation? What challenges or barriers did the participants encounter in implementing action research? To what extent did participants engage in cycles of problem identification, systematic data collection, reflection, analysis, data-driven action taken, and, finally, problem redefinition?	<u>Participants</u> • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Review of participant documents	Application of new knowledge and skills to improve student performance and engagement STEM classes

Phase IV: Capstone Project – Aligned with Objectives III and IV			
	Sample Questions	Examples of Sources/Tools	What is measured
4.d. Use of Virtual Learning Community	To what extent was the Virtual Learning Community (VLC) utilized and effective in development of tools, pedagogy, and problem solving? What did participants learn from virtual feedback from instructors and peers? To what extent do participants have access to sample lessons and materials from the Program? How often do participants use the VLC communication technologies to communicate with other participants to improve their teaching? How often do participants have the opportunity to observe and learn from other teachers effectively using the strategies in their classrooms? How often do participants use sample lessons as a teaching resource that demonstrates effective use of the strategies in the classroom? How did participants contribute to the repository of resources? How did participants use the repository of resources?	Participants • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Review of participant documents	Effectiveness of VLC to enhance participant learning and skills Application of new knowledge and skills to utilize VLC

Phase V: Implementation Plan – Aligned with Objectives I - IV			
	Sample Questions	Examples of Sources/Tools	What Is Measured
5.a Analysis of result of Capstone action research	How clearly did participants understand how to conduct micro- and macro-analysis of the results of their Capstone action research? To what degree were participants able to identify commonalities among research findings? How clearly did participants understand how to develop an implementation plan? How effective was the plan to institutionalize locally the strategies that resulted in positive outcomes in the Capstone phase? What challenges/barriers did participants encounter in completion of the implementation plan? What challenges did participants encounter in collaborating on dissemination of action research to broader STEM community? What did participants learn from feedback? What advantages did participants find from developing a fully formed implementation plan? How did the Program influence participants' teaching decisions?	Participants • Pre-training surveys and interviews • Post-training surveys and interviews • Focus groups • Assessments of content/learning by participants • Review of participant documents	Effectiveness of training on micro-and macro-analysis of results of Capstone action research Satisfaction and participation levels of participants Application of new knowledge and skills to develop implementation plan
Attribution/Contribution of the Program to Changes in Student Achievement and Learning			
	Sample Questions	Examples of Sources/Tools	What Is Measured
	To what extent did changes in pedagogy improve student outcomes and success? • Performance as measured by course grades, portfolio, or standardized assessment • Retention • Completion • Achievement in terms of advancing in coursework, degree, or career	• Qualitative (surveys of student satisfaction) and quantitative (student outcomes) analysis of student success as compared with those of an ex-post facto control group • Collection and analysis of disaggregated demographic, achievement and completion data of students of faculty participants, pre-and-post Program	Student learning outcomes, products and performances

Overall Program Evaluation				
	Sample Questions	Examples of Sources/Tools	What is measured	Use of Information
	Were the Program activities implemented as planned? Did staff members essential to the program receive adequate preparation for their roles? Are all participants completing all aspects of the Program? What problems arose during implementation? How are they resolved? Are all participants satisfied with the Program's services? Are resources adequate to implement the plan as intended? What modifications are necessary to improve the Program? What contributed to the Program's results? What explains the Program's outcomes? What policies, practices, and procedures in the institutional environment support or hinder the implementation of the Program?	Program Implementers • Surveys • Interviews • Focus groups	Effectiveness of Program Satisfaction and participation levels of participants	To provide proof that the program activities have been designed to meet the identified and ongoing needs of participants. To inform the content, design and delivery of future programs; Modification of program
	Was there adequate evaluation of the Program? If not, what could the Program do to improve the evaluation? Were the evaluation instruments effective? If not, what improvements are suggested? Was there formative evaluation? How were findings from the evaluation used? How did evaluation contribute to the Program's results?	Participants • Pre-training surveys and interviews • Post training surveys and interviews • Focus groups • Assessments of content/learning by participants • Review of participant documents	Effectiveness of Program Satisfaction and participation levels of participants	To inform the content, design and delivery of future programs; Modification of program; modification of evaluation plan

National[35] and Maryland[36] Teacher Professional Development Standards

NAPE used the National Staff Development Council's (NSDC) Standards for Staff Development as guidelines for the project to ensure knowledgeable expertise, research, insights into practice, classroom experience, and common sense converge to build a rigorous teacher training program that would provide teachers/faculty with the knowledge, skills, and tools to improve student learning. The following innovative elements of this project serve as the foundation for the development of the program.

1. **Strong leadership development process**
   - Program educates teachers/faculty on a process for continuous improvement to ensure sustainability.
   - Program empowers teachers/faculty to become school, community, campus, or state leaders in gender diversity improvement in STEM.
   - Teachers/faculty apply scientific principles and method to their classrooms creating a living laboratory for meeting program goals and objectives.
   - Teachers/faculty are required to research and produce original plans designed to further the program goals through a Capstone project and final implementation plan.
   - Program pairs teachers/faculty and content experts to create new instructional materials adapted to their needs.

2. **Supportive learning communities**
   - Extensive face-to-face or online contact engages and supports a community of practice.
   - Monthly online learning community meetings allows for productive, professional growth and development of teachers/faculty in a safe, supportive environment.
   - A virtual learning community provides for continually updated educational resource and tools.
   - Instructional materials integrate both STEM content and pedagogy.
   - Uses teacher/faculty feedback to improve the professional development model and create additional resources.

3. **Resources**
   - Program provides "ready-to-teach unit and lesson plans" aligned with NSDC standards.
   - Program provides resources including classroom exercises, pedagogical tools, planning framework, etc.
   - Program developed with guidance and support from Johns Hopkins School of Education.
   - Resources are vetted by award-winning STEM classroom teachers/faculty.

[35] Based on latest National Staff Development Council Standards approved in 2001. NSDC standards are currently under review in March 2011. Once approved, the standards will be updated and the operations reviewed to ensure continued compliance.

[36] Maryland Teacher Professional Development Standards (implemented in 2004) were aligned to NSDC standards. The items marked with an asterisk are noted as being categorized differently than the national standards (Content versus Process for instance) but are still consistent in intent.

- Program provides data and reports for teachers/faculty to assess their own instruction performance.

4. What teachers/faculty learn

- Program provides clear participant expectations.
- Program integrates real data from day one so teachers/faculty can learn a process for performance improvement.
- Teachers/faculty benefit from scenario-based learning strategies to understand clearly how to transform their practice.
- Program works backward from desired end result to what is needed to achieve it.
    - Identify learning and performance outcomes
    - Determine acceptable evidence
    - Plan learning experiences and instruction
    - Pay attention to enduring understanding and larger concepts.

Context Standards

National	Maryland	Key Concept
Organizes adults into learning communities whose goals are aligned with those of the school and district.	Professional development is most effective when it takes place in vibrant professional learning communities.	Learning Communities
Operationalized: The program provides for the full integration of learning communities in the following ways: (1) school, campus or department-based peer support by requiring two educators minimum participate in the professional development; (2) cohort development through a face-to-face workshop integrated with course customization for each discipline (such as CTE, Mathematics, Physics, Project Lead the Way, CISCO Networking Academies, etc.); and (3) the establishment of a virtual learning community that meets monthly to facilitate shared learning and sustainable classroom transformation.		
Requires skillful school and district leaders who guide continuous instructional improvement.	Professional development is most effective when there are strong leaders.	Leadership
Operationalized: Teachers/faculty must have demonstrated principal-, district-, and/or state-level support as documented by a letter.		
Requires resources to support adult learning and collaboration.	Professional development is most effective when there are adequate resources.	Resources
Operationalized: Easy to use and accessible online tools will allow teachers/faculty to gather data, conduct self-assessments, and make or improve pedagogy in their classrooms to benefit their students. Changes will be easily integrated, supportive, and create minimal disruption.		

Process Standards

National	Maryland	Key Concept
Uses disaggregated student data to determine adult learning priorities, monitor progress, and help sustain continuous improvement.	Effective teacher professional development relies on rigorous analysis of data.	Data driven
Operationalized: Educators will understand and integrate NAPE's Five-Step Program Improvement Process, which includes student and classroom performance data collection in Step One, analysis of the data in Step Three, and application of learning in Steps Four and Five. Further, educators will demonstrate learning related to the appropriate process and types of data collection to support learning objectives through end of module assessments and a Capstone project. The Capstone will demonstrate the participants' ability to collect, analyze, and integrate data-driven options for optimization of all student outcomes.		
Uses multiple sources of information to guide improvement and demonstrate its impact.	Rigorous evaluations assess the impact of professional development on teaching and student learning.	Evaluation
Operationalized: NAPE collects and continuously evaluates impact data needed to evaluate program success including: Disaggregated student enrollment data, performance data, completion data, and graduation data.		
Prepares educators to apply research to decision making.	*Effective professional development ensures that all teachers/faculty have the knowledge, skills, and dispositions to apply research to decision making.	Research-based
Operationalized: A rigorous research base has been developed by NAPE through its work with the NSF-funded STEM Equity Pipeline Project, which is constantly updated by researchers in the field. The teachers/faculty provide feedback on interventions as a means to support continuous research for identifying effective practices.		

Uses learning strategies appropriate to the intended goal.	*Professional development is most effective when there is consensus around clear expectations for what teachers/faculty should know and be able to do to help all students learn.	(N) Design (M)Effective Professional Development Standard
Operationalized: Each teacher will implement research-based effective practices in the classroom through two strategies: (1) small actions and pedagogical changes during the awareness phase of the learning, and (2) through a major Capstone project to be delivered in their classroom. The Capstone will include a process for measuring success, a communication plan for providing feedback on the success or challenges of all efforts, and a final Implementation plan (Step IV), which allows for a final revision plan for continuous improvement. Providing peer support, facilitated online and face-to-face instruction, and online tools provide multiple vehicles for addressing different learning styles to maximize participant learning.		
Applies knowledge about human learning and change.	Effective professional development content and process reflect best practices in workplace learning and in-depth understanding of how and why adults learn.	(N) Learning, (M) Design and Teacher Learning
Operationalized: Participants will benefit from content on learning theories related to gender and culture and provide simulation-based learning practice for participants to demonstrate improved pedagogy. Teachers/faculty will demonstrate through Steps II and III an improved awareness of effective strategies for increasing classroom inclusion and improving the climate for all students that will in turn lead to enhanced learning and performance outcomes of students. The Capstone assessment provides teachers/faculty an opportunity to demonstrate comprehensive learning of micromessages and process improvement.		
Provides educators with the knowledge and skills to collaborate.	*Effective professional development ensures that teachers/faculty have the knowledge, skills, and dispositions to collaborate with others to improve instruction.	(N) Collaboration, (M) Collaboration Content Standard
Operationalized: Create classroom, content specific, and virtual learning communities with monthly updates and discussions over the course of one year to build a cohort within a discipline and grow a community of practice.		

Content Standards

National	Maryland	Key Concept
Prepares educators to understand and appreciate all students, create safe, orderly and supportive learning environments, and hold high expectations for their academic achievement.	1. Effective professional development ensures that all teachers/faculty are able to create safe, secure, and supportive learning environments for all students. 2. Effective professional development ensures that all teachers/faculty have the knowledge, skills, and dispositions to meet the diverse learning needs of all of their students.	1. (N) Equity, (M) Student Learning Environments 2. (M) Diverse Learning Needs
Operationalized: Educators will demonstrate through end-of-unit assessments and a Capstone project their research-based understanding of the multi-cultural, multi-ethnic, multi-gender, multi-racial, and multi-ability diversity and the impact of micromessages on student performance. They will demonstrate their ability to address them, such that students will feel more welcomed, empowered, and supported in their classroom and be able to increase recruitment, retention, performance, and completion as a result.		
Deepens educators' content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use various types of classroom assessments appropriately.	Effective professional development deepens all teacher/faculty content knowledge and the knowledge and skills necessary to provide effective instruction and assess student progress.	(N) Quality Teaching (M) Content Knowledge and Quality Teaching
Operationalized: Educators will "try" small pedagogical and instructional changes in Steps II and III and report their experiences and outcomes in Steps II and III. Learning at these Steps will lead to a Capstone project at the end of the course specific to their discipline, such that they can demonstrate the awareness of and adjustment for potential micromessages in their classroom, assess the impact of their interv ention, and demonstrate the ability to revise and improve their strategy for continuous improvement.		

Provides educators with knowledge and skills to involve families and other stakeholders appropriately.	Effective professional development ensures that all teachers/faculty have the knowledge, skills, and dispositions to involve families and other community members as active partners in their children's education.	Family Involvement
Operationalized: Educators will become aware of the societal and cultural issues at work outside the classroom that work within their classroom. As a result, they can work within their disciplinary learning community such that they can provide a parent/guardian program about their discipline that creates awareness of the importance of the discipline for a diversity of students, including encouraging multicultural parents of children in nontraditional disciplines. In addition, the inclusion of business role models and nontraditional students at higher grades, as well as others may be utilized to demonstrate the value of students' engagement in nontraditional fields.		

Organizational Expertise:

The National Alliance for Partnerships in Equity (NAPE) is a consortium of state and local agencies, corporations, and national organizations committed to the advancement of equity and diversity in classrooms and workplaces. NAPE was chartered in 1990, but has roots back to 1979 when a group of dedicated state sex equity coordinators formed a committee to sponsor an annual national sex equity conference. In 1993**,** NAPE became independent and began the process of incorporating and obtaining its nonprofit status as a 510(c) (6). NAPE's membership is currently comprised of member states and has expanded the membership opportunity to local and community organizations through an affiliate membership status. NAPE's efforts since 1990 have focused on gathering and disseminating information, developing equity resource materials, sponsoring professional development, and collaborating with other organizations.

The NAPE Education Foundation, Inc. (the Foundation, or NAPE-EF) was established in 2002 in response to requests for assistance with program improvement efforts by education and workforce agencies across the nation. The Foundation shares NAPE's commitment to the advancement of equity and diversity in classrooms and workplaces. The Foundation is a 501(c) (3) organization. During the past seven years, the Foundation has developed a strong Board of Directors and with a budget of over $700,000 per year to serve the nation.

While NAPE and the Foundation are two separate organizations with separate governance structures, they share staff and high-level goals. This strategy document was developed for the Foundation by a task force of staff and board members, but reflects the ongoing partnership with NAPE.

NAPEEF supports the ***Micromessaging to Reach and Teach Every Student*** institute by providing the following products and services:

- Educating state and national legislators on career-related equity and diversity issues
- Developing tools and curricula for educators
- Training educators on the use of tools and curricula
- Providing conferences that support the dissemination of all outcomes and lessons learned
- Providing webinars on key topics
- Developing reports on all outcomes of the work
- Providing input to others' research or this project

Appendix One: Glossary of Terms

1. **Classroom Transformation:** The act of changing teacher instruction and pedagogy such that the classroom becomes different (not just better) and leads to improved student performance. According to Robert Davidovich's article titled "To Tackle New Problems, We're Going to Need New Solutions" (April 2011) classroom transformation requires teacher professional development that provides new information, a shared identity, and networked relationships (http://www.learningforward.org/news/getDocument.cfm?articleID=2244). The micromessaging program will provide teachers/faculty with new knowledge about diverse student engagement and learning (particularly girls), among teachers/faculty from targeted STEM disciplines, and includes a learning community to support the network of teachers/faculty in their school and within their STEM discipline.
2. **Educators:** A term used to designate all those individuals participating in the education process of students, including teachers, faculty, counselors, and administrators.
3. **Instruction:** Imparting knowledge or information. Through the professional development, the teacher will make adjustments and accommodations to ensure the knowledge or information shared with students will improve student learning. Examples of instructional interventions include the following:

   Administrative interventions:
   - Change classroom décor.
   - Provide courses at times more appropriate for women and minorities.

   Curricular interventions:
   - Change textbook.
   - Revise course PPTs.
   - Rework word problems.
   - Provide additional and appropriate classroom resources.
   - Increase frequency of class level assessment.
   - Connect curriculum to service learning.
   - Modify course objectives and/or requirements.

4. **Micro-affirmation:** Positive, powerful micro-messages contribute to feeling valued and belonging.

5. **Micro-inequities:** Negative micro-messages devalue, discourage. and ultimately impair performance in school. Often the absence of a positive message is in essence a negative message.

6. **Micromessages:** Small, subtle messages, sometimes subconscious, that are communicated between people often without saying a word. These messages include looks, gestures, tone of voice or the framing of feedback.

7. **Pedagogy:** Instructional methods. Examples of pedagogical interventions include the following:

- Incorporate teaching best practices such as cooperative learning.
- Accommodate learning styles geared toward individual differences.
- Develop learning options in a structured environment.
- Provide models of desired behaviors and skills.

8. **Research-based**: According to the National Staff Development Council, the use of the term "research-based" varies considerably (http://www.learningforward.org/standards/researchbased.cfm). Therefore NAPE-EF has defined the term as meaning a program or practice that has been evaluated using a scientific or quasi-scientific method (to account for human subjects) by a qualified academic expert in the field and is supported by at least one peer-reviewed article in a respected research journal.

9. **Resources:** Can be anything required to complete the activity, project, or program.

10. **Student Performance Outcomes:** Student academic outcomes including the following. Measurement of these outcomes may vary by state, school, and instructor.

    - Course or program enrollment decision
    - Retention/attrition in the course or program
    - Academic performance in the class
    - Successful completion of the course or program

Appendix Two: Learning Community Activity: Peer observation of classroom behavior using a check sheet

Micromessages: Conveying Implicit Bias in the Classroom Peer Evaluation

To provide outcome feedback for this workshop and to help you become more aware of micromessaging, we ask that you participate in two peer evaluations: one at the beginning of the ***Micromessaging to Reach and Teach Every Student*** program, and one at the conclusion of the Phase III Workshop.

Procedures:

1. Prior to the observation, you and your partner should arrange for a pre-visitation meeting to discuss all aspects of the course and how it is being taught.
2. At the pre-visitation meeting, your partner will gather information on the demographics of the course being observed.
3. During the classroom visitation, your partner will respond to the statements below.
4. After the classroom visitation, we ask that you arrange for a post-visitation meeting with your partner to exchange comments and suggestions.
5. Your partner will then submit the visitation form to the program instructor; however, the information you provide is confidential and will be used only to evaluate the impact of the workshop on your awareness of micromessages and any transformation in practice.

Indicate approximate percentage of students in the class:

Ethnicity (Indicate % of class)
__ Hispanic/Latino
__ Not Hispanic/Latino

Race (Indicate number, regardless of Ethnicity):
__ American Indian or Alaskan Native
__ White
__ Pacific islander
__ Black or African American
__ Asian

Gender (Indicate number):
__Female __Male

Please check the box that best describes your position or role/responsibility:
- o Teacher
- o Counselor
- o Administrator
- o Parent
- o Community Volunteer
- o Community Based Organization
- o Staff
- o Other (specify)

Please use the space below to expand on any of the criteria on page two. If you require a response, please include your name and contact information.

To what extent did you observe your partner do the following? Please describe the measure used to determine your decision. Examples might include the number of times students were called on, the length of time provided for a response, the number of follow-up questions provided as encouragement or help, facial expressions, comments, level of engagement when listening (fully attentive versus distracted) etc.

	Evident	Not evident	Not applicable	Evidence/interactions to support your rating:
1. Took a different tone of voice with boys than with girls.	❑	❑	❑	
2. Took a different tone of voice with individuals of certain ethnicities and/or races.	❑	❑	❑	
3. Interacts more with boys than with girls.	❑	❑	❑	
4. Interacts more with individuals of certain ethnicities and/or races.	❑	❑	❑	
5. Demonstrated different expectations of boys than girls.	❑	❑	❑	
6. Demonstrated different expectations of individuals of certain ethnicities and/or races.	❑	❑	❑	
7. Called on boys more than girls to participate in class.	❑	❑	❑	
8. Called on individuals of certain ethnicities and/or races to participate in class.	❑	❑	❑	
9. Had more eye contact with boys more than girls	❑	❑	❑	
10. Had more eye contact with individuals of certain ethnicities and/or races.	❑	❑	❑	
11. Asked more questions of boys than girls.	❑	❑	❑	
12. Asked more questions of individuals of certain ethnicities and/or races.	❑	❑	❑	
13. Gave more time to answer questions to boys than girls.	❑	❑	❑	
14. Gave more time to answer questions to individuals of certain ethnicities and/or races.	❑	❑	❑	
15. Provided examples that were more geared toward boys than girls.	❑	❑	❑	
16. Provided examples that were more geared toward individuals of certain ethnicities and/or races.	❑	❑	❑	
17. Used language that suggested gender bias.	❑	❑	❑	
18. Used language that suggested cultural bias.	❑	❑	❑	
19. Encouraged boys more than girls with regard to identifying strengths and assets and career choice.	❑	❑	❑	
20. Encouraged individuals of certain ethnicities and/or races with regard to identifying strengths and assets and career choice.	❑	❑	❑	

Adapted from MECCA Trainer's Guide, Utah State Department of Education; the Gender *Equity Lesson Plans and Teacher Guide for High Schools*, Springfield Technical Community College, 1999, and Loyola University in MD Peer Review document.

NAPE Equity in Education Professional Development

SurveyMonkey

1. Please tell us a little about you by checking appropriate response to the items below. I am:

		Response Percent	Response Count
Male		**74.0%**	**37**
Female		26.0%	13
		answered question	**50**
		skipped question	**0**

2. I teach the following grades(mark all that apply to you)

	Response Percent	Response Count
9th	46.0%	23
11th	78.0%	39
Other,	14.0%	7
10th	72.0%	36
12th	**80.0%**	**40**
	If other, please specify below	8
	answered question	**50**
	skipped question	**0**

3. I teach the following courses:

	Response Percent	Response Count
Networking for Home and Small Business	31.8%	14
Working at Small or Medium Business or ISP	20.5%	9
Introduction to Routing & Switching in the Enterprise	9.1%	4
Design & Support Computer Networks	11.4%	5
Networking Fundamentals	11.4%	5
Routing Protocols and Concepts	4.5%	2
PC Hardware and Software*	29.5%	13
Introduction to Engineering Design	**47.7%**	**21**
Digital Electronics	31.8%	14
Pathway (Computer Integrated Manufacturing)	13.6%	6
Civil Engineering & Architecture	13.6%	6
Aerospace Engineering	4.5%	2
Biotechnical Engineering	0.0%	0

Capstone (Engineering Design & Development)		34.1%	15
		answered question	**44**
		skipped question	**6**

4. I also teach the following courses.

		Response Percent	Response Count
life science or biology		2.9%	1
chemistry		0.0%	0
computer science		14.7%	5
any level of mathematics		11.8%	4
information technology		17.6%	6
any other type of technology		29.4%	10
physical science		0.0%	0
physics		8.8%	3
pre-engineering		**41.2%**	**14**
any other type of technology		38.2%	13
		if other type of technology, please specify below	17
		answered question	**34**

skipped question	**16**

5. Please use the following scale to indicate your understanding of the following issues. (1) none (2) a little (3) some (4) good (5) very good

	(5)	(4)	(2)	(3)	(1)	Response Count
a. Under-representation of girls in advanced STEM courses.	**40.5% (17)**	**40.5% (17)**	4.8% (2)	11.9% (5)	2.4% (1)	42
b. Under-representation of women in STEM careers.	**39.0% (16)**	29.3% (12)	4.9% (2)	19.5% (8)	7.3% (3)	41
c. Micro-messaging in K-12 STEM classrooms.	10.0% (4)	5.0% (2)	17.5% (7)	17.5% (7)	**50.0% (20)**	40
d. Gender bias in computer games and simulations.	19.5% (8)	14.6% (6)	12.2% (5)	**29.3% (12)**	24.4% (10)	41
e. Research concerning the neuroscience link to learning.	2.5% (1)	15.0% (6)	30.0% (12)	20.0% (8)	**32.5% (13)**	40
f. Pedagogy that enhances learning in STEM classrooms.	20.0% (8)	**30.0% (12)**	15.0% (6)	22.5% (9)	12.5% (5)	40
g. Attribution differences among different groups of students (gender, race, ethnicity).	12.8% (5)	25.6% (10)	20.5% (8)	**30.8% (12)**	10.3% (4)	39
h. Parental and early childhood influences on learning.	28.2% (11)	**38.5% (15)**	10.3% (4)	17.9% (7)	5.1% (2)	39
i. Societal influences on girls' course and career decisions.	25.6% (10)	**33.3% (13)**	5.1% (2)	28.2% (11)	7.7% (3)	39

j. Influence of role models and mentors on career choices.	28.2% (11)	**35.9% (14)**	12.8% (5)	17.9% (7)	5.1% (2)	39
k. Influence of guidance counselors on career choices.	17.9% (7)	23.1% (9)	**25.6% (10)**	23.1% (9)	10.3% (4)	39
l. Under-representation of minority students in STEM advanced courses.	**28.2% (11)**	**28.2% (11)**	15.4% (6)	20.5% (8)	7.7% (3)	39
m. Under-representation of minorities in STEM careers.	25.6% (10)	**28.2% (11)**	17.9% (7)	20.5% (8)	7.7% (3)	39
					answered question	**42**
					skipped question	**8**

6. Please use the following scale to indicate your experience with the following activities. (1) none (2) a little (3) some (4) frequent (5) extensive

Scales

	(5)	(4)	(3)	(2)	(1)	Response Count
a. Talked with my school's guidance counselor about gender equity.	7.3% (3)	**24.4% (10)**	22.0% (9)	**24.4% (10)**	22.0% (9)	41
b. Talked with my school's guidance counselor about the classroom performances of diverse students.	17.1% (7)	24.4% (10)	24.4% (10)	7.3% (3)	**26.8% (11)**	41
c. Talked with an administrator at my school about gender equity.	14.6% (6)	24.4% (10)	**31.7% (13)**	14.6% (6)	14.6% (6)	41
d. Talked with an administrator at my school about diverse student's classroom performance	22.0% (9)	**31.7% (13)**	22.0% (9)	12.2% (5)	12.2% (5)	41
e. Met with parent/adult groups to discuss equity issues in STEM.	7.5% (3)	10.0% (4)	15.0% (6)	20.0% (8)	**47.5% (19)**	40
f. Met with groups of interested teachers to discuss equity issues in STEM.	22.0% (9)	9.8% (4)	22.0% (9)	9.8% (4)	**36.6% (15)**	41
g. Reviewed classroom materials for approaches that appeal to diverse students.	25.0% (10)	17.5% (7)	**30.0% (12)**	15.0% (6)	12.5% (5)	40
h. Reviewed technology for its interest to diverse students.	26.8% (11)	12.2% (5)	**29.3% (12)**	17.1% (7)	14.6% (6)	41

i. Reviewed technology for its interest for girls.	19.5% (8)	**34.1% (14)**	17.1% (7)	22.0% (9)	7.3% (3)	41
j. Developed materials (print, audio, technology) to enhance the interests of girls.	14.6% (6)	22.0% (9)	**31.7% (13)**	17.1% (7)	14.6% (6)	41
					answered question	**41**
					skipped question	**9**

7. Please indicate your interest in one or more of the following by checking all that interest you.

		Response Percent	Response Count
a. Online professional development on equity issues.		41.7%	15
b. Combined online and face-to-face professional development on equity issues.		38.9%	14
c. A face-to-face workshop on equity issues in STEM.		**44.4%**	**16**
d. Doing an action research project in your classroom.		38.9%	14
e. Participating in an online discussion group on equity issues		22.2%	8
		answered question	**36**
		skipped question	**14**

8. Please indicate your preference for the following option. (check that all that apply)

		Response Percent	Response Count
a. The professional development that includes graduate credits.		58.3%	21
b. The professional development that includes continuous education units (CEUs).		**63.9%**	**23**
c. The professional development that is non-credit.		19.4%	7
d. The professional development that includes credits for certification renewal.		55.6%	20
		Other (please specify)	2
		answered question	**36**
		skipped question	**14**

Page 1, Q2. I teach the following grades(mark all that apply to you)		
1	You for got POE Principles of Engineering for #3	Mar 25, 2011 8:05 AM
2	Middle school	Apr 1, 2011 2:41 PM
3	6,7,& 8th grade Technology Education	Apr 1, 2011 2:46 PM
4	Community College	Apr 1, 2011 2:50 PM
5	college	Apr 1, 2011 4:04 PM
6	I am a mentor to College graduate students who are pursuing their Master's degree in Teaching.	Apr 3, 2011 12:42 AM
7	As a district-level supervisor, I am responsible for 9-12	Apr 3, 2011 1:08 PM
8	6-8	Apr 7, 2011 11:52 AM

Page 1, Q4. I also teach the following courses.		
1	AP Economics	Mar 24, 2011 8:06 PM
2	Principles Of Engineering PLTW	Mar 24, 2011 9:01 PM
3	Foundations of Technology, Intro. to Technology Systems	Mar 24, 2011 10:19 PM
4	Principles of Engineering	Mar 24, 2011 10:43 PM
5	Cabinetmaking	Mar 25, 2011 7:36 AM
6	Architecture	Mar 25, 2011 7:38 AM
7	Advanced Design Application	Mar 25, 2011 8:05 AM
8	Architectural Engineer Design	Mar 25, 2011 8:15 AM
9	Electronics	Mar 25, 2011 10:15 AM
10	Principles of Engineering, Computer Aided Design and Drafting, Foundations of Technology	Mar 28, 2011 2:16 PM
11	Foundations of Technology	Apr 1, 2011 2:33 PM
12	CAD	Apr 1, 2011 4:04 PM
13	Foundations Of Technology, Technology Systems 1 & 2	Apr 3, 2011 12:42 AM
14	Drafting	Apr 4, 2011 8:02 AM
15	gateway to technology	Apr 7, 2011 11:52 AM
16	Technology Education	Apr 15, 2011 7:04 AM
17	woodshop	Apr 15, 2011 7:47 AM

Page 3, Q8. Please indicate your preference for the following option. (check that all that apply)		
1	Paid	Mar 25, 2011 8:20 AM

Page 3, Q8. Please indicate your preference for the following option. (check that all that apply)		
2	I don't mean to be rude, but during what free time am I expected to add this to an already overcrowded schedule?	Apr 15, 2011 7:30 AM

NSF REPORT ON STEM EQUITY EVALUATION WORK

This section describes the results of data collected during Year 4 for purposes of program evaluation by MPR Associates (MPR). The evaluation was designed to accomplish three major goals: (1) to provide useful and actionable feedback for the STEM Equity Pipeline project team regarding the quality and effectiveness of training and services; (2) to synthesize feedback on the tools and processes developed as part of this project; and (3) to provide evidence of implementation success and impact on student and teacher outcomes.

Summary of findings:

Overall summary

From the its start in October 2007 through June 2011, the STEM Equity Pipeline Project has reached thousands of individuals through a variety of settings and communication tools. Services offered by the project– including 5-Step Program Improvement Process training workshops and webinars–have had 4,305 participants, with 858 participants in Year 4. As extension agents, the participants reported sharing what they had learned with an estimated 10,000 individuals during Year 4 through informal sharing with colleagues, career fairs and conference events, and listservs and other media.

Participants regarded project services and materials to be of consistently high quality, and the content useful for both pilot site and state-level project-related activities and in their own work. As in past years, the 21 events offered by the project in Year 4 were rated favorably by participants, with uniformly high average ratings of 3 or better on the evaluation survey items on a 4-point scale (1- strongly disagree, 4-strongly agree). In interviews, project participants described the training as "excellent" and as providing tools that would enable them work through the 5-Step Process and also to advocate for STEM Equity with colleagues and the leadership in their institutions and states.

In terms of outcomes, interviews with project participants indicate that the project is increasing the engagement and interest of participants in gender equity in STEM. Project participants

reported greater awareness of and engagement with opportunities to promote gender equity in their work, as well as increased interest among colleagues in gender equity issues. Quantitative data on program enrollments by gender suggest that the project activities have contributed to an increase in the number of female participants in STEM-related CTE programs in at least two of the pilot sites. It is difficult to definitively attribute changes in female program participation rates to project-related activities, due to data limitations. However, these findings are supported by interviewees who have reported increased interest by students in STEM fields at their institutions, as well as upticks in female participation in STEM-related courses and extra-curricular activities that they attribute to project efforts.

Summary Details

As indicated by the summary participant statistics noted above, the Pipeline Project has reached thousands of individuals through a variety of formats. As of Year 4, some 50 pilot sites are engaged in the 5-Step Process in 9 of the 11 states that have participated in the project, and more than 70 secondary schools and postsecondary institutions have participated in pilot site activities. The project's virtual learning community (VLC) is also very active: the live project webinars have had 1,410 attendees and the archived webinars 359, the STEM Equity Pipeline Website has had 1, 126,679 hits, and the listserv 3,695 members (all VLC numbers duplicated).

During Year 4, a total of 339 evaluation surveys were administered to participants at 21 virtual and in-person events. All of the events were received favorably by participants, with uniformly high average ratings of 3 or better on the survey items on a 4-point scale (1- strongly disagree, 4-strongly agree). Some of the respondents included comments in response to open-ended questions; these responses were also uniformly positive and included indications that their participation had suggested concrete steps that they could take to promote STEM equity at their home institutions. The more than 20 participants interviewed in Year 4 also praised project services and materials and reported finding the training workshops valuable. Through the project's Extension Agent Survey, some 95 individuals that participated in project activities reported sharing what they had learned though informal interactions with colleagues, events, and listservs and newsletters that reached an estimated 10,393 individuals in Year 4.

The Year 4 interviews with state-level and pilot site project participants indicate that their involvement in the project has increased their engagement and interest in STEM equity and increased their comfort and facility in working with data for program improvement. Additional outcomes reported by interviewees included heightened interest in and awareness of STEM equity issues among faculty and increased interest in STEM-related programs among female students. Finally, the interviews with individuals from the states that joined the project in Years 1 and 2 and have since completed the two years of intensive project services revealed sustained engagement with STEM Equity issues and continued project activities. Project participants have reported continued work with the 5-Step Process and ongoing engagement with the implementation and evaluation of strategies to increase female participation in STEM fields.

Finally, the evaluation team has worked with states and pilot sites to collect quantitative data on participation and completion rates by gender in STEM-related CTE programs nontraditional for females. This effort has revealed a number of limitations regarding using these data to assess program outcomes. These limitations include privacy laws limiting access to statewide and local site data, volatile enrollment numbers that vary widely from year to year, and changes in data systems that that hinder multi-year comparisons. Nevertheless, analyses of multi-year data at two of the pilot sites revealed modest but steady increases in the number of females participating in or completing STEM-related CTE programs, suggesting that the program may be having an impact on female involvement in these programs.

Data Collection Methods

The following data collection strategies were used to collect data on project implementation and outcomes during Year 4:

Tracking of Participant Numbers and Evaluations of Events and Webinars and Viewership of Archived Webinars

As in previous years, the project collected participant numbers for project services and feedback data on all major in-person events and webinars. The evaluation team developed, administered, and analyzed event evaluations from the 21 on-site and virtual events (including webinars)

offered directly by the project staff in Year 4. This year's analysis also includes viewership statistics on 17 archived webinars that project participants and others can access on the Pipeline Project Website at any time. Since this is the first year that the evaluation team has analyzed the data, the report summarizes data for all the year, from the first recorded view in August 1, 2008 to June 30, 2011.

Extension Agent Survey

To understand how project participants share the information and training offered by the project's staff with others, a Web-based Extension Agent Survey was initiated in March 2009. Periodic reminders to the project's listserv prompt participants to report on their extension of services beyond the work conducted by core facilitators. In Year 4, some 126 surveys were completed by 95 individuals who had participated in project services and then went on to share what they learned in their own settings. These activities included in-service training sessions, conference and workshop presentations, newsletter and listserv communications, and other ways of sharing information that together reached an estimated total of 10,400 individuals. A summary of our analysis of these reports for Year 4 is included in this report.

Since this is the second to last year of the project, this report also includes a summary of extension agent survey data collected since Year 2. Over the 2.5 years that these data have been collected, 326 surveys have been completed, and the activities reported reached an estimated 18,900 individuals. The summary includes information on the types of events through which information has been shared and the states of the survey respondents for each year.

Pilot Site Participant Survey

In Years 3 and 4, the project shifted from training state-level extension agents to a focus on providing 5-Step Process training and facilitation with teams at local pilot sites. This occurred after collecting data on the results of state-level training and determining that more concentrated work at the local level might have greater potential to bring about desired results, i.e., changes in participation rates of females in nontraditional courses. To gather information about pilot site participants' knowledge of and past experiences with STEM equity work, 75 attendees at the first 5-Step training workshops held in Georgia, New Hampshire, Ohio, and Texas were asked to

complete a short background survey. The survey asked participants about their familiarity with a variety of STEM equity-related topics, as well as whether they have received professional development on STEM equity or participated in projects designed to promote the same. After two years, the same participants will be asked to complete a post survey, and the results will be analyzed to explore how participation in the project changed their knowledge of and commitment to STEM Equity.

Interviews with State-level and Pilot Site Participants

To gain an in-depth understanding of participants' experiences in the Pipeline Project, the evaluation team conducted a total of 20 telephone interviews with from one to four pilot site or state-level project participants from nine of the eleven participating states. The nine states are those either in the first two years of the project, or state that have completed two years in the project and have maintained project-related activities and/or pilot sites. Oklahoma was excluded because project-related activities in the state are no longer ongoing. In Illinois, 5-Step Process activities are continuing in conjunction with the New Look project, and the evaluation team has plans to follow up with a number of New Look sites in the fall.

The interviews addressed state and pilot site teams' accomplishments and challenges, participants' perceptions of the quality and value of the project's services and materials, and project sustainability. The analysis resulted in a list of implementation and outcome findings and six themes related to the goals of the project that were developed from the interviewees' responses. The six themes are: understanding and using data; awareness of and commitment to STEM equity issues; quality of project services and resources; partnerships; accomplishments; and project sustainability. The findings and themes will inform the project's activities as well as the work to be conducted with states and pilot sites during the fifth and final year of the project.

Quantitative Data Collection

As in previous years, the evaluation team collected quantitative data on the number and percentage of female participants and completers (or concentrators, depending on data

availability) in STEM-related CTE programs associated with occupations that are nontraditional for females. The team collected data from state-level sources (CTE data analysts or Web-based data archives), with the exception of several states (Illinois, Minnesota, Ohio, and Texas) in which data privacy restrictions limited the collection and use of state-level data at the secondary, postsecondary levels, or both. In these states, state facilitators are working with the evaluation team to collect data directly from the participating sites. Data collected were analyzed and will be used for benchmarking in training, to analyze female participation and completion rates in STEM CTE programs, and to gauge program impact.

Project Participation Numbers

The Project activities have reached thousands of individuals that have participated by attending national, state, and pilot site in-person events, logging onto a webinar, or by using the project Website. From Project Years 1 to 4 (through 2011), the number of participants in any project training activity reached 4305, including some 648 participants in in-person 5-Step Program Process Improvement Training workshops offered by the project staff. The number of participants in Year 4 was somewhat lower than the 205 recorded in Year 2 and 245 in Year 3, reflecting the fact that relatively fewer states were still in their first two years of project activities in Year 4, and that training in Texas was completed in Year 3. Some 50 pilot sites are engaged in the 5-Step Process in 9 of the 11 states that have participated in the project, and more than 70 participating secondary schools and postsecondary institutions have participated in pilot site activities. The project's virtual learning community is also very active: the live project webinars have had 1,410 attendees and the archived webinars 359, the STEM Equity Pipeline Website has had 1, 126,679 hits, and the listserv 3,695 members (all numbers duplicated). Finally, the STEM Equity Pipeline Leadership Institute held in Washington, DC in April 2011 had 79 participants, and 160 individuals attended the NAPE Professional Development Institute that followed.

Event and Activity Evaluations

As in the first three years of the NAPE Stem Equity Project, surveys were distributed at the end of events offered by project staff to ascertain attendees' attitudes related to the content of the event, accomplishment of objectives, contribution to progress on their own goals, and topics of information they would like to learn more about. Events for which evaluation surveys were used included training workshops and meetings in participating states, national events and the leadership institute, and webinars. A total of 339 evaluation surveys were collected for 21 events conducted throughout Year 4 (Table 1).

Table 1. Number of project activities evaluated during year 4 (July 1, 2010 to June 30, 2011), by month and location

	2010							2011				
	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
California												
Georgia					1						1	
Illinois												
Iowa	1	1							1			
Minnesota												
Missouri												
New Hampshire			2					1				
Ohio				2				1		1	1	
Oklahoma												
Texas				1								
Wisconsin		1										
National Events				1						1		
Other States			1									
Webinars							1	1	1			

Events Conducted in Project States

The majority of events surveyed were state meetings and 5-Step Process training workshops. A total of 16 such events were evaluated in Year 4 (evaluation forms are included in the appendix). The evaluation survey questions covered participants' self-reported understanding of material covered in the event, such as gender equity awareness and general project information, and their ability to use what they have learned, including confidence in carrying the project forward, working with data within the 5-Step Process, and knowledge about project resources available.

Several evaluation survey questions were repeated across most or all of the events to provide an overall sense of participants' perceptions of project events (Table 2). These questions are presented in the form of statements to which the respondent must indicate their level of agreement. Table 2 shows how many event surveys included each statement, and the average rating on a four-point scale, where 1=strongly disagree, and 4=strongly agree. Average responses were 3.3 or higher, and the highest rating (3.6) was for "The materials provided (e.g. handouts) will be useful for my work." The lowest rating (3.3) was found for, "I have ideas about how to use the information learned in my pilot site," but the score still indicates that participants on average agreed with the statement.

Table 2. Respondents' average responses to evaluation questions asked for multiple events
(1 = Strongly Disagree; 4 = Strongly Agree)

Statement	Number of Events	Average Rating
The session was carefully planned and organized	16	3.5
The content of the event will be useful for my own work	6	3.4
The materials provided (e.g. handouts) will be useful for my work	10	3.6
I have ideas about how to use the information learned in my pilot site	10	3.3
Total number of event evaluations completed	339	

Aside from the common questions summarized in Table 2, evaluation surveys also included a number of scaled and open-ended response questions that were customized to fit the content of each event. As was the case for the common questions, on average, respondents indicate that they agreed or strongly agreed with all of the statements, with average ratings of 3 or better. Responses to open-ended questions were also positive and provided information on what the participants planned to do with what they learned, as well as suggestions for improvements and future events. The following section summarizes each event surveyed, including a brief description of the event, the number of participants, and selected and representative survey results.

Events in States Participating in the Project

Georgia

November 16, 2010

A training workshop on the 5-Step Process (all steps) was held at Southwest Georgia Technical College in Thomasville, Georgia. The event was led by the Georgia state facilitator, Claudia Morrell, and Mimi Lufkin. Twenty-two attendees from pilot sites around the state participated, and 19 completed an evaluation survey.

Based on the responses, participants agreed that the training gave them a better understanding of the 5-Step Process, accountability data, and root causes (average ratings 3.4, 3.4, and 3.5, respectively). In addition, participants left the session with an understanding of how to write objectives for their pilot sties and develop their implementation plan, as well as with ideas of what to do next at their pilot sites (average ratings 3.3, each). At the end of the survey, participants were asked to write a brief description of what they will do next as part of their involvement with their pilot sites, and 12 answered. About half indicated that they would seek additional information, and about half indicated specific steps related to the 5-Step Process or promoting gender equity in other ways. Representative responses included:

- "I will browse different hyperlinks regarding strategies and evaluation surveys."
- "Review the assessments and other tools that can be used in conjunction with surveys."

- "Pull additional data to help better determine root causes."
- "Incorporate STEM activities in our college-wide strategic planning."
- "Create an evaluation survey to determine pre- and post-activity awareness."

May 10-11, 2011

The state facilitator for Georgia, Claudia Morrell, held a meeting for pilot site participants at the Heart of Georgia Technical College in Dublin, GA. The meeting reviewed the 5-Step Process and discussed survey design and the development of effective marketing materials for recruiting females in STEM programs. The session had 10 attendees, and 8 completed an evaluation survey.

The event was rated highly by the survey respondents, who reported that the session gave them a better understanding of the 5-Step Process and provided resources and ideas for their future work around STEM equity (average ratings 3.4 and 3.9, respectively). Participants strongly agreed that the discussion of their colleges' plans helped them to better understand options for identifying and addressing the needs of students pursuing nontraditional careers (average rating 3.6). Further, participants strongly agreed that the discussion of marketing, social media, and brochure development gave them ideas for developing resources that they can use, including webinars (average rating 3.8).

Iowa

July 6, 2010

As part of the requirement that all Iowa community colleges participate in the 5-Step training as a condition for receiving a state discretionary grant funded out of Perkins, a workshop was conducted by Courtney Reed-Jenkins, the state facilitator, at Iowa Lakes Community College in Emmetsburg, IA. Three of the sixteen community colleges attended this workshop, during which steps 1-4 were covered. During the workshop, each college identified programs to focus on during the school year, identified root causes and began to select strategies to address those causes. Five of the session's 10 attendees completed an evaluation survey.

The survey results indicated that the respondents found the workshop to be well-organized and useful overall (average rating 3.8, each). Participants agreed that they will be able to use the data presented (or similar data) to identify gaps in performance between different groups of students, and that they have an idea of what data sources they can use to identify those gaps (average rating 3.4, each). They also felt that the workshop gave them an increased understanding of current root causes research related to participation and completion of women and girls in STEM (average rating 3.6). Lastly, participants agreed that they have a better understanding of how to evaluate strategies, how to match strategies to the identified root causes, and how to identify resources for researching potential solutions that can be implemented (average ratings 3.4, 3.4, and 3.6, respectively).

August 5, 2010

As part of the requirement that all Iowa community colleges participate in the 5-Step training as a condition for receiving a state discretionary grant funded out of Perkins, Courtney Reed-Jenkins held a workshop on steps 1-4 of the 5-Step Process for administrators and faculty members from 7 Iowa community colleges at the Des Moines Area Community College in Ankeny, IA. The session had 36 attendees and 20completed an evaluation survey.

Survey responses were generally positive and respondents felt that what they learned in the workshop would be useful to their work related to gender equity (average rating 3.3). Participants reported that the workshop provided them with an increased understanding of the root causes identified in research on participation and completion of women and girls in STEM (average rating 3.4). When asked about their own research and evaluation, participants agreed that they will be able to use the resources and tools identified in the session to conduct their own action research to identify potential root causes (average rating 3.4). At the end of the survey, participants were asked to provide a brief description of something they will do as a follow-up to the meeting. The eight responses included:

- "Write my grant. Plan a signature event to address leaks in the pipeline."
- "Discuss with students, faculty and high schools possible implementation strategies."

March 25, 2011

Another workshop took place at Eastern Iowa Community College, Davenport, IA. The training was conducted by Courtney Reed-Jenkins and was designed to train K-12 Counselors and EICCD full time Advisors to work with underrepresented populations. 18 career and guidance counselors from around the state attended, and 17 completed a survey.

The session was reviewed favorably by the survey participants. Participants agreed that they understood the trends of female students in STEM classes, including career and technical education and post-secondary (average rating 3.4). They also agreed that they can identify "bridge" or "transition" points for females in STEM classes and careers, and that they learned the differences between female and male students in nontraditional careers (average ratings 3.3, each).

At the end of the survey, participants were asked to provide a brief description of something they will do as a follow-up to the meeting, and seven participants answered this question. Responses included:

- "Explore more opportunities (websites) for girls to use when doing the career exploration unit."
- "Actively engage and encourage male and female students to explore opportunities in the nontraditional career arena."
- "Discuss with other counselors about the risk of biased counseling. Re-assess techniques I am using to be sure of being unbiased."
- "Will continue doing job, I feel I have addressed nontraditional career opportunities for the female students I meet."
- "Develop a girl-focused STEM career event."

New Hampshire

September 21, 2010

The state facilitator for New Hampshire, Mimi Lufkin, held a workshop for pilot site participants at Granite State College, Concord, NH on the 5-Step Process. 17 state members attended the session, and 16 completed an evaluation survey.

Based on the survey responses, the workshop was viewed favorably by the participants, who felt the session was well organized and that the materials would be useful in their work (average ratings 3.5 and 3.4, respectively). The event gave participants a better understanding of the 5-Step Process, accountability data, and root causes (average ratings 2.9, 2.8, and 3.0, respectively). Most participants agreed that they understand the components of the 5-Step Process and will be able to implement steps 1 and 2 at their pilot sites (average rating 2.9). In addition, participants left the workshop with ideas of what to do next and reported that it helped them understand the need to conduct surveys at their pilot sites (average rating 3.1). Among the 15 participants' responses indicating what they will do as a follow-up to the meeting were the following statements:

- "I want to look at 5-Step change process and its adaptability to implementation of new initiative planning."
- "Take a look at individual sites to identify areas to focus on."
- "We will develop surveys to determine root causes."

September 22, 2010

The state facilitator for New Hampshire, Mimi Lufkin, conducted a training session focused on providing professional development for STEM educators at Granite State College in Concord, NH. During the session, participants learned about the STEM Equity Project, the 5-Step Process, and about available resources available on STEM equity issues. The meeting had 16 attendees and 13 completed an evaluation survey.

The survey respondents strongly agreed that they understand the purpose and goals of the Pipeline Project (average rating 3.8). They also agreed that they now have a basic understanding of the 5-Step Process, and that the literature review on root causes research will be useful to them

in their work on gender equity (average ratings 3.2 and 3.4, respectively). In addition, participants felt that the workshop increased their understanding of the importance and relevance of gender equity work and helped them develop new ideas about how they will be able to promote and disseminate information and resources about STEM Equity in the state (average ratings 3.5 and 3.4, respectively). At the end of the survey, participants were asked to share any additional comments. Responses included:

- "Thank you for providing so many resources, ideas and practical activities. I enjoyed this thoroughly!"
- "I would love to see a workshop where people in NH could come together to share what they are doing specifically and successfully to increase nontraditional participants to STEM programs and how they are getting teacher involvement."
- "The second day helped solidify ideas I had learned from the first day. Have lots of ideas to share with non-traditional coordinators, etc."

February 23, 2011

Project participants convened for a workshop held at Plymouth Graduate Center, Concord, NH on steps three through five of the 5-Step Process led by Mimi Lufkin. The workshop had 13 attendees, and 11 completed an evaluation survey.

Based on the survey responses, participants agreed that they learned about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.5 and 3.4, respectively). They strongly agreed that as a result of this session, they know how to find Web-based resources to help them identify and plan an implementation strategy based on their identified root cause(s) (average rating 3.8). They also now know the difference between a summative and formative evaluation and the importance of both (average rating 3.4). In addition, participants left the session with ideas of what to do next at their pilot sites (average rating 3.5).

Ohio

October 15, 2010

The state facilitator for Ohio, Katherine Weber, held a workshop for project participants at Washington State Community College, in Marietta, OH, on steps 1 and 2 of the 5-Step Process. During the training, the team decided on a possible root cause and created an action plan to investigate the potential cause. The workshop had 11 attendees, and 10 completed an evaluation survey.

Survey responses were very positive for this event. Participants strongly agreed that they understand the components of the 5-Step Process and will be able to implement steps 1 and 2 at their pilot sites (average rating 3.6). They also agreed that they gained a better understanding of documenting performance results, CTE accountability, and of how to look at trends and patterns in their districts' data (average ratings 3.4, 3.6, and 3.6, respectively). At the end of the survey, participants were asked to write a brief description of a concrete step that they will do next as part of their involvement with their pilot sites. The nine responses to this question included:

- "Meet to learn steps 3 to 5."
- "Collect names of my non-traditional students to participate."
- "Become more aware of how I deal with students, how they deal with each other, classroom, environment, etc."
- "Review causes of data discrepancies."
- "Will talk up the pilot site implementation at the state level."
- "Focus groups/surveys."
- "Complete benchmarking of a program vs. 4 other institutions."

October 25, 2010

The state facilitator for Ohio, Katherine Weber, held a workshop at Cincinnati Nature Center in Cincinnati, OH on the 5-Step Process. The purpose of the training was to provide the Five Step Program Improvement Process training on Steps 1 and 2. 23 state members attended the session, and 16 completed a survey.

Participants responded very favorably to the training. Almost all respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.4). They also strongly agreed that the materials provided were useful for learning what they need to know and do as part of their pilot site work (average rating 3.5). The participants agreed that the exercises that were included in the discussion of root causes helped their understanding and felt that they got ideas about how they can use what they learned in their work with their pilot sites (average ratings 3.1, each). Lastly, participants were asked to share any additional comments about the training. Several respondents mentioned that they enjoyed the training. One respondent felt it would have been useful to better understand the data they were looking at in the training.

February 28, 2011

A workshop on steps three through five of the 5-Step Process was held in Cincinnati, OH. 10 project participants attended the session, and 8 completed a survey.

The evaluations indicated that participants strongly agreed that the workshop taught them about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.8 and 3.5, respectively). They also strongly agreed that they learned about new tools to help them with project management that will help them implement their selected strategies (average rating 3.6). They also indicated that they have ideas about how they can use what they learned at the training in their work at the pilot sites (average rating 3.6). At the end of the survey, participants were asked to provide questions or note issues that they are unsure about. Three participants listed items and these were:

- "Evaluation tools that lead to true measure of outcome."
- "About objectives and choosing strategies as well as validating root causes."
- "I'm a little unsure about the process, but I know I can get help when I put it together."

April 8, 2011

The state facilitator for Ohio, Katherine Weber, held a workshop at Sinclair Community College in Dayton, OH on steps 3-5 of the 5-Step Process. Six pilot site participants attended the session, and all of them completed an evaluation survey.

The evaluation survey responses indicated that participants agreed that the workshop was well organized and that the materials would be useful to them in their work (average ratings 3.6 and 3.3, respectively). Participants strongly agreed that they had learned about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.5 and 3.7, respectively). Participants strongly agreed that they now know how to write a SMART objective (average rating 3.6). The survey also asked participants to write a brief description of something that they will do next as part of their involvement with their pilot sites. The five responses to this item included the following two:

- "Work on our identified strategy to collaborate with partners to gather data around non-traditional recruitment and hiring practices and opportunities."
- "Sustain engagement with the project."

May 6, 2011

The state facilitator for Ohio, Katherine Weber, held a workshop at Washington State Community College in Marietta, OH on steps 3-5 of the 5-Step Process. The facilitator used focus group data collected from the pilot site to demonstrate the steps. Six project participants attended the event, and all of them completed an evaluation survey.

The survey respondents strongly agreed that they learned where there are lots of web-based resources to help them identify and plan an implementation strategy based on their identified root cause(s) (average rating 3.6). Participants also agreed that they learned about new tools to help them with project management that will help them implement their selected strategies and that they have ideas about how they can use what they learned at the training in their work at the pilot

sites (average ratings 3.2 and 3.6, respectively). Descriptions of what participants would do as a follow-up to the meeting were:

- "Investigate the possibility of female engineering cohort."
- "Write a SMART objective for what I want to accomplish."
- "Involve STEM in current projects."

Texas

October 5-6, 2010

The state facilitator for Texas, Susie Wheeler, and Mimi Lufkin held a meeting for project participants at the Texas Association of College Technical Educators (TACTE) Conference in Austin. The session was the first meeting of the four community colleges selected to participate as pilot sites (with secondary partners) in the Pipeline Project in Texas. The purpose of the meeting was to review the 5-Step Process and to set deadlines for each phase. Eight state members attended the session, and 6 completed an evaluation survey.

Participants responded well to the meeting. All respondents strongly agreed that the training reflected careful planning and organization (average rating 4.0). They also strongly agreed that the materials provided were useful for learning what they need to know and do as part of the 5-Step Process as their sites (average rating 4.0). Further, they strongly agreed that the session improved their knowledge of the 5-Step Process (average rating 4.0). They also indicated that they understood the expectations for the pilot sites and what they will need to do to evaluate the work (average rating 3.8). The respondents felt that the session helped them to develop a plan for moving ahead with work in the pilot sites, and that they have ideas about how they can use what they learned at the training (average ratings 3.8, each).

Wisconsin

August 12, 2010

Project participants convened for a planning meeting at Lakeshore Technical College in Cleveland, WI. The session focused on coordinating and planning future activities. 10 state members attended the session, and 8 completed an evaluation survey.

Based on survey results, participants agreed that the discussion of the calendar was efficient and productive, and that it resulted in a clear set of dates for events (average ratings 3.1 and 3.4, respectively). They also agreed that they were able to set priorities for project activities based on their groups' interests, and that the groups were able to determine several interests that they could pursue collaboratively (average ratings 3.5 and 3.6, respectively). In addition, participants felt that they were able to identify lead coordinators and set dates for the next events as well as create action plans for all activities (average ratings 3.5 and 3.1, respectively). At the end of the survey, three participants shared additional comments. All were positive and included:

- "Very productive. Appreciated the input from the Girl Scouts and 4-H representatives - very helpful!"
- "Excellent meeting - good work - lots of great ideas and activities to pursue."

STEM Equity Pipeline National Leadership Institute

April 10, 2011

State team and pilot site leaders met at the National Leadership Institute on April 10, 2011, at the Doubletree Hotel in Crystal City, VA. The meeting was facilitated by Mimi Lufkin and members of the STEM Equity Pipeline Team and brought together state and pilot site team leaders from different states to enable them to meet one another and learn from the experiences of other states. The training session included presentations by team leaders who shared successes and challenges as well as set expectations for the project. Attendees participated in small and large group discussions in addition to the presentations. 79 project participants attended the session, and 59 completed the survey.

At the beginning of the survey, participants were asked to indicate which state they were from and to list their position or role. Of the 59 respondents, 57 indicated their state. The states with the most representatives were GA (11), OH (7), NH (6), CA (5), IA (5), MN (5), and WI (5). The

other represented states were IL (4), MO (3), TX (3), ID (2), and CO (1). A variety of positions and roles were listed by the participants. The most frequently listed positions included Special Populations Coordinator, CTE Coordinator, Perkins Coordinator, and involvement in vocational education and career counseling.

In the evaluation survey, respondents strongly agreed or agreed that they learned implementation strategies from other states (average rating 3.6). Respondents also agreed that learning about other states' experiences with the project gave them ideas for addressing challenges in their own states (average rating 3.5). In addition, participants felt that they benefited from networking with other states during the institute (average rating 3.6). Most participants agreed that they now know more about the role of participating states in the collection of data for the project evaluation (average rating 3.1). They also generally agreed that they developed a better understanding of how the national context and social climate impact gender equity work (average rating 3.3). At the end of the survey, participants were asked if they would read a STEM Equity Pipeline blog if one was made available on the project website, and if so, to state which topics they would like to see covered. Most participants agreed that they would read the blog (average rating 3.2) and many topics were suggested, including the following:

- "Innovative strategies for STEM participation and STEM program retention"
- "Collaboration of education, business and industry, rural pops versus urban pops, socioeconomic challenges - what to do??"
- "Data, benchmarking, performance targets and best practices"
- "Tool kits; step by step strategies."
- "Research, pilot projects, best practices"

Other Events

Kansas

September 20-21, 2010

A meeting was held for individuals interested in the Pipeline Project at the Greenbush Center for Staff Development in Wichita, KS. The session focused on nontraditional participation and completion focusing on stereotypes/changing unconscious bias and ways to increase awareness of NTO's. The event had 75 participants, and 50 completed an evaluation survey.

The evaluation responses were positive. Respondents agreed that the session gave them a better understanding of how to identify appropriate data, how to evaluate potential root causes and solutions, and provided them with information about available resources (average ratings 3.2, 2.9, and 3.1, respectively). In addition, participants left the session with ideas of how to improve STEM equity in their own schools.

At the end of the survey, participants were asked to write a brief description of something they would do next as a follow-up to the meeting, and 21 respondents included this information. The most frequently mentioned actions were sharing what they learned at the session with other CTE staff, further examining their own data and programs, and taking steps to increase the recruitment for women and girls in STEM and improving retention.

National Career Pathways Network Conference

October 22, 2010

A STEM Equity Pipeline Workshop was conducted at the National Career Pathways Network Conference at the Sheraton Dallas Conference Center, Dallas, TX. The purpose of the workshop was to provide an overview of the Five Step Program Improvement Process. The session had 12 attendees, and 10 completed an evaluation survey. The participants included teachers, administrators, counselors and school staff.

Based on the survey results, most participants strongly agreed that they understood the purpose and goals of the STEM Equity Project (average rating 3.7). They also agreed that they are now familiar with the 5-Step Process, and that the case study that was presented as part of the workshop aided their understanding (average ratings 3.4 and 3.5, respectively). In addition, participants felt that the workshop raised their awareness of the value of quantitative data as a

decision-making tool for program improvement and that the discussion of research-based root causes led them to want to know more (average ratings 3.4 and 3.3, respectively).

Webinars

The STEM Equity Pipeline Project sponsored three webinars that were conducted by experts in the field of STEM equity during Year 4. These sessions allowed attendees from across the U.S. to gain knowledge of current research on STEM equity and policy issues related to gender equity in STEM fields. Evaluation surveys were administered at the end of the webinars asking about participants' experiences, and average ratings for each event were at least 2.9 or higher. All of the surveys had three items with statements about the event in common (Table 3). On a 4-point scale (1=strongly disagree and 4=strongly agree), participants overall agreed that each Webinar was well-planned and organized (3.5), useful for worked related to gender equity (3.3), and that they did not have any logistical issues with connecting to the Webinar (3.2).

Table 3. Webinar participants' average response to survey questions (1 = Strongly Disagree; 4 = Strongly Agree)

Statement	Average Rating
Webinars were carefully planned/organized	3.5
Content will be useful for work related to gender equity	3.3
Had no logistical issues with connecting to webinar	3.2
Total number of Webinar evaluations completed	286

The following are summaries of each of the three webinar events:

Spark Talented Minority Girls' Interest in Engineering, Female Recruits Explore Engineering: The FREE Project

January 27, 2011

The first webinar had 112 participants from 11 states and was hosted by Monica Bruning, the director of the Outreach and Recruitment office for the College of Engineering at Iowa State University. This session presented the Female Recruits Explore Engineering (FREE) Project as a strategy to increase the number of girls in STEM. The session taught participants how to implement the project with an online tool-kit that included guidelines for reviewing data and research related to girls pursuing engineering careers. Most respondents agreed that they now have a good understanding of the FREE project as a strategy to increase the participation of girls in STEM courses and careers (average rating 3.1). They also learned about implementing the project (FREE) with an online tool kit (average rating 3.3). Overall, participants agreed that the session added to their understanding of data and research related to girls pursuing engineering careers (average rating 2.9).

Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets

February 16, 2011

The second webinar had 65 attendees from 8 states and was hosted by Fred Smyth, a faculty member in the Department of Psychology at the University of Virginia. The session acquainted participants with the theory of implicit mindsets, and how implicit mindsets impinge upon important, sometimes life-altering, judgments and decisions. The facilitators also addressed research linking implicit biases to critical STEM outcomes, as well as methods for measuring implicit bias in STEM. The Webinar included a demonstration of the Web-based Implicit Association Test.

Survey respondents agreed that this webinar made them aware of implicit mindsets in STEM, and the measurability and effects of implicit mindsets (average rating 3.4). They also agreed that they learned about research linking implicit biases to critical STEM outcomes (average rating 3.3). Further, respondents agreed that the session added to their understanding of ways to measure implicit bias in STEM, including the demonstration website for the Implicit Association Test, and taught them strategies for changing implicit biases and combating their negative effects (average ratings 3.4 and 3.2, respectively). Respondents believed that after participating in the

session, they will adopt a mindset that "nurture" has more of an effect than "nature" on perceptions of STEM ability (average rating 3.2).

Cognitive Beliefs and Cultural Variables Matter in STEM Career Development

March 22, 2011

The final webinar had 109 participants from 17 states and was hosted by Angela Byars-Winston, a faculty member in the Department of Counseling Psychology at the University of Wisconsin–Madison. The Webinar focused on the relationship between cognitive beliefs and cultural values and academic and career commitment in science and engineering. The Webinar presented data from studies of underrepresented STEM populations at the undergraduate level and examples of strategies for improving gender equity in STEM.

Survey respondents agreed that they became aware of how social cognitive theory applies to STEM career development (average rating 3.5). They also learned about career development research that has focused on racial/ethnic minority undergraduates in STEM (average rating 3.6). Further, the session added to the respondents' understanding of ways to increase STEM career interests and commitment to research (average rating 3.3). Respondents agreed that after participating in the webinar, they will be able to adopt one or more of the strategies that were shared (average rating 3.2).

Archived Webinars

In addition to the new webinars presented during Year 4, the STEM Equity Website offers 21 archived webinars. Table 4 lists the 11 archived Webinars that had at least 5 viewers from August 2008 to June 2011, and the total number of viewers and viewers from states participating in the project for each.[1] Webinars are archived soon after they are presented live, and therefore, Year 4 Webinars also had viewers and are included in the list. The remaining archived webinars

[1] The STEM Equity Pipeline Project states are California, Georgia, Iowa, Illinois, Minnesota, Missouri, Ohio, Oklahoma, New Hampshire, Texas, and Wisconsin.

had fewer than five viewers each. From August 2008 (when the first view was recorded) to June 30, 2011, the archived Webinars had a total of 359 views: 285 from states participating in the Pipeline Project, and 74 (20.6 percent) from other states.

Table 4. Number of Viewers of Archived Webinars: August 2008 to June 2011

Title	Total number of viewers	Viewers from STEM Equity States
Documenting Performance Results: Step One of the Five-Step Program Improvement Process	6	3
Girl Tech: Mentoring Girls in STEM	6	4
How to Market Your CTE STEM Program: - Tell your story to the Right People, the Right Way and Get the Right Results	6	3
Nontraditional Career Preparation Root Causes	6	4
Cognitive Beliefs and Cultural Variables Matter in STEM Career Development	8	5
Oklahoma STEM Leadership Team Step 1	9	9
Pilot Site Orientation	14	13
Overview of the Five-Step Improvement Process	15	12
Louisiana Community and Technical College	17	0
Pink Brain, Blue Brain? Females and Males in Math and Science	115	8
Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets	162	7
Other archived Webinars	10	6
Total number of viewers	**359**	**74**

The webinars with the most viewers, *Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets* and *Pink Brain, Blue Brain? Females and Males in Math and Science* had 162 and 115 viewers each, respectively. Overall, viewers of the archived webinars included students (59.2 percent), instructors (13.2 percent), administrators (5.3 percent), state agency staff (5.9 percent), and others including researchers, counselors, program coordinators, and business representatives (9.6 percent combined). The remaining 6.9 percent did not indicate their role.

Pilot Site Participant Background Surveys

During Year 4, the evaluation team and project staff developed a plan for using pre- and post-surveys in pilot sites to gauge the project's impact on participants' knowledge, understanding, and interest in STEM equity issues. As part of this effort, pilot site facilitators and participants in states that joined the project in Years 3 and 4 were asked to complete a background survey. The survey asked about participants' current knowledge of STEM equity issues and also asked whether they had received professional development on gender equity and/or participated in any programs designed to promote gender equity during the previous five years. The survey was administered during the first in-person 5-Step training workshop offered by project staff in each site or state, and the results will serve as a baseline measurement. Pilot site participants will complete a post-survey after they have completed 2 years with the project, and the results of the two surveys will be compared to assess the effects of participation in the pilot project on their knowledge and awareness of issues related to equitable participation in STEM courses and careers and on their use of strategies to address the issues.

A total of 75 surveys were collected from pilot site participants in four states: Georgia (20), New Hampshire (17), Ohio (32), and Texas (6). The participants included teachers (14), administrators (29), and others (32), such as program coordinators, guidance counselors, and education consultations. Respondents were from a variety of institution types, including community colleges, elementary, middle and high schools, departments of education, and other community organizations.

Participants were also asked to rate their knowledge on a variety of topics with "1" meaning they are not familiar with the topic and "5" meaning they have high knowledge of the topic and could teach it to others. Topics for which participants reported high familiarity included teacher expectations, school climate, career development, cultural diversity and gender, and sexism, racism, bias, and stereotyping (average ratings for each of 3.4-3.5 out of 5). Overall, the facilitators had a slightly less than moderate level of knowledge of the research on women in STEM, strategies for increasing women in STEM, and where to find relevant resources (average ratings 2.5-2.7). They had less knowledge about the 5-Step Process (average rating 2.3). Only 12

participants rated themselves highly on any of these items (4 or higher). The participants were least familiar with attribution theory, micro-inequities, and spatial skills and visualization (average ratings 2.1-2.5 out of 5).

Using the same rating scale, participants were asked to rate their knowledge of various strategies, best practices, and models for promoting gender equity in STEM education. Participants were most knowledgeable of creating positive classroom climate, effective instructional practices, and creating a positive school environment (average rating of 3.5 for each). They reported less knowledge of conducting a nontraditional career fair and gender equity leadership for administrators (average ratings 2.1).

Lastly, participants were asked several questions about their training and professional background. Fifty-six percent of the respondents said that they had received some professional development training on the use of data for program or instructional improvement. The majority (71 percent) reported that they had used data in their work to identify performance gaps or to improve their programs. Less than half of the participants (40 percent) stated that they had received professional development training related to gender equity. Finally, 33 percent said that they had participated in a program designed to increase female participation in STEM or CTE courses and programs.

Extension Agent Surveys

The Extension Agent Survey is a web-based reporting tool accessed through the STEM Equity Pipeline Project Website.

http://www.stemequitypipeline.org/StateTeams/ExtensionAgentReporting.aspx

The survey asks individuals that have participated in one or more project activities (extension agents) to report how they have shared the information they learned through the project with their colleagues at the state, district, and school levels; students, and community members. Periodic e-mail reminders to the STEM Equity listserv prompt extension agents who have attended 5-Step Process training or other professional development provided by the STEM Equity Pipeline project to complete the short survey. The survey requests some basic

demographic information and then asks respondents to describe how they shared the information, whether through one-on-one sharing with colleagues or in more formal presentations at conferences and workshops. Respondents are also asked to describe the content of what they shared and how they learned it, the size and type of audience, any feedback they received, and to provide suggestions they might have for improving the training and information offered by the STEM Equity Pipeline Project.

The first completed extension agent surveys were submitted in March 2009. In response to participant feedback at the State Leadership Institute in April 2010, the survey was revised in Year 3. The revision made reporting on multiple events easier by allowing respondents to summarize information for all the events in a quarter (July-September, October-December, January-March, and April-June) in one survey, rather than having so submit a new survey for each event. The new survey also included a new question about the source of the information that the extension agent shared.

Summary of Extension Agent Reports for Years 2 through 4 (March 2009 through June 2011)

As an indication of the scope of extension agent activities since reporting began in March 2009, this section provides a summary of the number of individuals and states represented in the survey data. Extension agents have completed a total of 326 reports (Table 5). The new version of the extension agent survey created in Year 4 allows respondents to report multiple events in one survey, and, as a result, the number of surveys declined from 145 in Year 3 to 126 in Year 4. The number of extension agents submitting surveys, however, increased from 63 in Year 3 to 95 in Year 4. The number of reported events also increased, with 66 reported in Year 2, 146 in Year 3, and 247 in Year 4. The most commonly reported events were conferences/workshops (149) and one-on-one sharing with colleagues (138). The surveys indicate that an estimated 18,928 people have been reached through conferences, workshops, in-service trainings, meetings, and one-on-one sharing. Between Project Years 2 and 3, the reported number of people reached tripled (from 2,035 to 6,500) and increased by about 60 percent from Years 3 to 4 (from 6,500 to 10,393, respectively). Since the format of the survey changed over the course of the project, the numbers

should be regarded as rough estimates but do indicate that the reach of activities has increased significantly. Also, it should be noted that these numbers likely underestimate the number of program participants sharing what they have learned, since the respondents complete the surveys voluntarily and on their own time.

Table 5: Overview of extension agent survey results, March 2009 to June 30, 2011 (years 2 through 4)

	Year 2	Year 3	Year 4*	Total
Number of Extension Agents Reporting	52	63	95	210
Number of Extension Agent Reports	66	145	126	326
Number of Events Reported:				
Conference/Workshop	13	61	75	149
In-Service Training	15	22	32	69
Other (presentations, team meetings, planning meetings, newsletters, etc.)	15	39	49	103
One-on-One Sharing with Colleagues	23	24	91	138
Total Events Reported	66	146	247	459
Estimated Number of People Reached	2,035	6,500	10,393	18,928

* Year 4 survey allowed respondents to summarize participant numbers across events; the number presented here are estimates based on those responses.
Note: Because not all agents filled in the number of attendees for the events, reported numbers may be lower than the actual attendance totals.

Over three-quarters of the reports (about 83 percent) were submitted for events that occurred in the 11 states that are past and present project participants. The states that had the largest number of reported events (including one-on-one sharing) across the 3 years were Illinois (130) and Wisconsin (108). Reports were received from a total of eight non-participating states in Years 2 and 3 (Arkansas, Arizona, Colorado, Idaho, Michigan, Pennsylvania, Vermont, and West Virginia) and 18 in Year 4 (Arkansas, Colorado, the District of Columbia, Indiana, Kansas,

Maryland, Michigan, Montana, North Carolina, New York, Oregon, Pennsylvania, South Dakota, Tennessee, Virginia, Vermont, Washington, and Wyoming).

Year 4 Extension Agent Survey Result Details

Following on the Extension Agent Report summaries of previous Pipeline Project NSF reports, this section provides additional details about the surveys completed in Year 4. As in earlier years, Year 4 respondents were asked to choose an occupational category that best describes their position. Of the 66 extension agents who provided this information, a plurality was comprised of administrators (31), followed by state education agency staff members (7), teachers/instructors (7), and counselors/mentors (6). Other roles listed included business/industry representatives, outreach coordinators, and CTE specialists. The largest increase from the previous year was in the number of administrators submitting reports, which jumped from 11 in Year 3 to 31 in Year 4. The activities reported were one-on-one sharing (91), regional, state and national conferences/workshops (75), other meetings and presentations (49), and in-service training events (32). The "other meetings and presentations" included items like recruitment presentations and career fairs. Respondents were also asked to indicate the type of audience for the reported activities, and respondents could choose more than one category. The most popular categories were teachers, administrators, counselors, students, scientists, and business/industry representatives, and most events included participants from several of these groups.

Respondents were also asked to provide the name of the events in which they shared the information. Example of the types of conferences/workshops and in-service trainings are listed below:

Conference and workshops

- 2010 Illinois Project Lead the Way Counselor and Administrator Conference
- Forum for Excellence
- Marketing STEM to Girls, a conference sponsored by the WGCP and NAS

In-service training

- Ohio Perkins Coordinators' Spring Meeting
- Ask the Expert professional development series
- Nontraditional Pilot Exploratory Meeting

The new survey also asked participants to indicate how they learned the information they shared by choosing one or more information sources from a list. Some 110 of the 145 surveys included a response to this question, and most selected multiple sources of information (see table 6).

Table 6. Most Common Sources of Information Shared by Extension Agents.

	Number of responses[1]	Percentage of respondents choosing this option
STEM Equity Webinar	55	50%
STEM Equity Website	41	37%
In-Person, 5-step training conducted by STEM Equity Pipeline project staff	31	28%
STEM Equity Pipeline presentation at a conference or workshop	26	24%
State Team Meeting	25	23%
NAPE Professional Development Institute	24	22%
Pipeline Press Newsletter	23	21%
Total number of sources indicated	225	n/a
Total number of responses	110	n/a

[1] **Respondents could choose more than one source of information**

The most frequently selected sources of information were a STEM Equity webinar (50 percent of respondents) and the STEM Equity Website (37 percent). Participants also shared information learned during a 5-Step training workshop conducted by STEM Equity Pipeline project staff (28 percent), STEM Equity Pipeline presentations at conferences and workshops (24 percent), state

team meetings (23 percent), the NAPE Professional Development Institute (22 percent), and the Pipeline Press Newsletter (21 percent).

Activity Feedback and Suggestions for the STEM Equity Pipeline Project

Extension agent survey respondents were also asked to briefly describe the feedback they received from participants. A total of 88 surveys included participant feedback for the reported activities. The newer version of the survey allowed respondents to select from a list of options and provided space for respondents to write in additional feedback. The open-ended comments showed that the events reported by the extension agents were generally well received by the attendees. A few noted that some attendees wanted more concrete directions for their situation, and others didn't feel they had the time or resources for the program. The most frequently selected feedback items from the new survey are listed below:

- Greater awareness of STEM-equity issues (52)
- Greater awareness of root causes regarding gender equity in STEM (31)
- Greater awareness of data regarding gender equity in STEM (29)
- Follow-up inquiries requesting other materials or information (23)
- Greater awareness of the need for program evaluation (21)
- Additional meetings planned (14)
- Interest in implementing the 5-Step process (11)

Examples of additional activity feedback include:

- "Better understanding on marketing of STEM to appeal to underrepresented groups."
- "Greater awareness for what is taking place at our local and school level."
- "I plan to work with teacher groups regarding nontraditional workshops."
- "Enthusiastic participation in the STEM Startling Statements activity."

- "I had the sense that they wanted to hear less about the project and more about how they could apply the resources."
- "There was excellent interaction during the workshop and very positive evaluations. Participants appreciated the resources offered."
- "The feedback was that we could not take on this project in light of the other projects and priorities at the college. We will re-visit this issue again next year."

At the end of the survey, respondents were asked to provide suggestions for future professional development or curriculum development that would help them more effectively conduct their training. Forty-one of the surveys had responses to this question. The majority of the responses concerned suggestions for additional resources on specific topics. Several respondents suggested continuing the free resources such as Webinars and newsletters. Several also suggested making events more interactive for attendees. Several respondents also commented on what they felt worked well. Selected examples are reproduced below:

- "I would love more specific workshop topics for staff development in house and activities to bring awareness of gender issues."
- "Building regional partnerships to connect work with economic development efforts. Need a broader scope to ensure sustainability and institutionalization."
- "Add some more interactive activities."
- "Evaluation and assessment techniques for program improvement and student impact.
- "Helpful Power Points and other resources that can be used to educate people. Such tools have been developed and provided. The presentation I did was a modification of such a Power Point."
- "I work in a State Dept of Education and find the topics presented to be of real value. However, I need to find the time to preview the presentations that are available in my free time. I am not always available when they are going live."

- “I would like specific activities that volunteers could do to work with groups of girls to encourage them to consider technology related careers.”
- “Materials to share with teachers and parents and students. I've used ‘Why so Few,’ and that was very well received.”
- “More accessible data on trends in women's employment, salary and demand for trained workers (outside of Startling Statements). Had to hunt for data from one of the NAPE National Conference sessions I attended.”
- “More global awareness and international collaborations with countries in Central and Western Europe.”
- “More practical experience and in-depth information on development of survey instruments, data collection, and data interpretation would be very helpful.
- “Opportunities to learn more about/meet/network with other individuals who are interested in doing research. I just learned of the STEM Equity Pipeline, and I’m not sure if you already have something like this. I need to explore your website more. Some type of online way to meet would be great in these economic times when travel dollars are so limited.”
- “The participants in the workshop asked several questions about resources around scholarships for female engineers.”
- “We need information on how to help industry and business representatives become involved with the STEM Equity Pipeline’s initiatives. Let’s do more collaborative work with the employers.”
- “The webinars are very good. I don't mind if there is some overlap between topics, or if one webinar reviews some of what was in another. I will keep trying to attend.”
- “The information that we have received thus far has been very beneficial.”

Interviews with STEM Equity Pipeline Project Participants

To learn about the implementation process, activities, and accomplishments of states that had participated in the project, the evaluation team interviewed 20 pilot site[2] and state-level project participants from nine states. These interviews followed a previous set of interviews conducted with five states that had participated in the project for the first two years, and several of the interviewees participated in both rounds of interviews. The Year 4 interviewees were from California, Georgia, Iowa, Minnesota, Missouri, New Hampshire, Ohio, Texas, and Wisconsin. Interviews were conducted by telephone in May and June of 2011 using a semi-structured interview protocol. The final analysis was based on interviews with 20 participants, and included from one to four interviewees from each state.

Interviewees were asked to describe their teams' accomplishments and challenges, assess the project's services and materials, and describe their plans for the project during the next year. They were also asked to reflect on their team's success in meeting the project's goals and how their project work had changed their own awareness of STEM equity issues and approach to their work in education. Participants' answers were confidential, and only summary information was shared with the project team (information that might identify a state or individual was removed).

The interview notes were coded for themes and patterns, and the general themes that emerged were synthesized into a set of statement to inform project planning and development.

The following are the primary findings from the interviews regarding implementation and outcomes.

Implementation:

- Participants supported the pilot site approach and felt it to be an effective means of working with the 5-Step Process and building support for the project at their sites and within their states.

[2] Sites that had implemented specific strategies at local level in an effort to increase impact of the project goal to effect changes in female participation in non-traditional coursework.

- Project services, including ongoing technical support and the 5-step training workshops, received high praise. Participants almost universally described the workshops as excellent and valuable.
- Several interviewees from sites that had been part of the project for more than two years noted that they could have used more support in following through over time. In particular, they requested strategies for revisiting the steps and evaluating the impact of their work after the chosen strategies are implemented.
- Depending on their role in the project, pilot site participants reported spending an estimated 24 to 120 hours on project activities during the past year. These hours were generally added to existing workloads or volunteered.
- Participation levels ranged from administrators who reported spending a few hours per month coordinating faculty member and other staffs' efforts, faculty members devoting an estimated 2-3 hours a week, to a gender equity coordinator who devoted one quarter to one third of a part-time position to project activities.
- Interviewees reported extensive use of the NAPE and STEM Equity Websites to find materials useful for the Pipeline project and their own work. Most reported watching at least one Webinar. Use of SharePoint Websites varied by state and pilot site. Interviewees that reported using the SharePoint site described it as a place to store project materials, and only two reported using it to access materials from other sites. Several respondents expressed interest in a more interactive site that would encourage networking with others. All of the respondents indicated that they chiefly use e-mail for communications.

Outcomes, successes, and sustainability:

- Data work in connection with the Pipeline Project has led to the recognition of inaccurate data on nontraditional participation and completion rates in four states over the course of the project. In each of these states, project participants have taken steps to address the issue with data analysts at the state or local level and improve data quality.

- Project participants reported that the project had increased their awareness and understanding of STEM Equity issues, and as a result, had both changed and intensified their engagement with these issues in their work.
- Project participants in sites that had implemented at least steps 1 to 3 of the 5-Step Process noted increases in female participation and completion in STEM-related CTE courses and extracurricular events.
- Project-related activities–particularly at pilot sites–continued in the five states that joined the project in Years 1 and 2 and completed their two active years in the project. These sites reported continued engagement with the 5-Step Process and were appreciative of the ability to contact project staff for support as challenges arose.

Project Themes

The interviews also explored several themes that built on the themes that emerged out of the Year 3 interviews. Where relevant, the following analysis includes information from the Year 3 interviews to further elucidate the Year 4 findings for each theme described below:

Understanding and Using Data

In the Year 3 interviews, respondents noted that their engagement in the Pipeline Project had resulted in their working with their districts and institutions to develop a "culture of data" and being more actively engaged in using data to understand and improve their programs. Participation in the NAPE STEM Equity Pipeline project also encouraged participants to be more critical about the data quality and the quality of the data reports they receive. Participants in three states also reported advocating for changes in the way the data are reported and used at both the state and local levels.

In Year 4, respondents also reported that the project increased their engagement with and use of data both to understand and improve their CTE programs. Participants in two states reported data improvements underway as part of the project activities. Another interviewee described a partnership between the state education agency and the Pipeline Project participants to provide

professional development on the 5-Step Process to schools working to improve participants that is being developed.

Interviewees' statements about their experiences using data in the project included:

- "This [project] was the first time we had looked at data like this. We were aware that we needed to improve female participation but did not have a plan for it. We are now following a cohort of 6th graders to see how they enroll in their classes in high school and eventually hope to see the impact of the activities in college."
- "Most unexpected for us in the project was what the data showed—you know it is bad, but don't know how bad it was. The attrition rate was much more substantial than retention."
- "In the 5-Step training, we used the demographic data here and also worked with the area high schools. We actually looked at our demographics, and that provided us with some insight. We had not done that before."
- "The most surprising thing we found was how the [secondary and postsecondary] data didn't correlate. How can we know if we are being successful if data systems don't talk to each other? We have all these projects going on. How do we know if they are successful?"

Commitment and Awareness to STEM Equity Issues

Participants reported increased awareness of and commitment to improving STEM Equity in their state for females and other special populations. They felt that their own awareness had grown, and often that of their colleagues as well:

- "The project has given me a better awareness of STEM equity and what we need to do to get students and instructors to participate more and to get conversations started with earlier grades. We are now talking to the preschool."
- "The attitude here now is that we are looking for opportunities. When we first pursued the … grant, we had no intention of doing nontraditional work. We incorporated

nontraditional issues after the fact [as part of this project]. We have taken nontraditional issues and embedded them into our daily work—it's now part of our focus."

- "We now have a bigger awareness [of STEM equity] on our campus… we presented at a staff development workshop in April and had 35 people attend our session."
- "In the training of new faculty, the gender equity component–I used to do only one little session [on this topic], but now it is in all of the sessions, and I incorporate gender equity into all of the training of new faculty."
- "I run the tech education department, and I am now working with the staff on female enrollment and working to change the attitudes—not things I really truly thought of before. I now ask the faculty: What are you doing when a female walks into your classroom?"
- "As an academic advisor, I now base my work on skills rather than the gender of the person. [The project] has made me more open and has made me want to learn about more careers such as engineering, and has helped me to listen more carefully to what my students are saying."

Project Services and Resources

As in Year 3, the Year 4 respondents reported that they found the 5-Step training and Webinars provided through the project valuable for their project activities and for their work in general. The products and services provided through the project were generally deemed to be of high quality. The following are characteristic of the interviewees' responses:

- "The training was wonderful. The most useful was the root causes analysis, and that we could bring that back and be able to use it with our faculty and staff."
- "The training was excellent–one of the reasons we really like this project, and the design of it. All of us like to do the research, and [the project] is research based. Allows us to go to our superiors and say here are the numbers, [and they] can't argue with them."

- "The root causes document is phenomenal because we would spend a whole meeting discussing that– it would keep us from going too fast without analyzing the data."

In both the third and fourth year interviews, most interviewees acknowledge that the process requires substantial involvement and time to build capacity for implementing it. In the third year interviews, some participants felt overwhelmed by the 5-Step Process and particularly by the work with data presented at the beginning of the training. In contrast, fewer respondents in Year 4 reported that they found the 5-Step Program Improvement Process complicated or intimidating. They generally reported that they had a good understanding of the steps and work involved, but several felt the information was presented too quickly. Several pilot site participants also felt a year to be inadequate to cover all of the steps. However, it should be noted that different individuals were interviewed in Years 3 and 4 and although the different responses might reflect Project changes, they might also be attributable to differences in the types of people interviewed. For example, Year 4 interviewees may have been relatively more experienced or comfortable with data than their Year 3 counterparts.

Partnerships

In both the Year 3 and Year 4 interviews, interviewees reported that their organization's work with the Pipeline Project had resulted in new partnerships between state agencies, non-governmental organizations, and individual participants. Respondents also reported new or deeper collaboration with elementary, middle, and high schools for CTE centers, high schools, and postsecondary institutions.

Specific partners reported by pilot site participants included the Girl Scouts, 4-H leaders, chambers of commerce, local manufacturers and other industries, Project Lead the Way, YWCA, and the Society of Women Engineers.

Successes

The respondents in the Year 3 interviews generally felt that two years was too short to see a difference in the number of females participating in STEM programs as a result of strategies introduced through the NAPE Pipeline Project. This observation was echoed by the states that

had recently joined the project in the Year 4 interviews as well: most were either choosing strategies or preparing to implement them.

Despite this concern about the time frame, several respondents from sites that are just beginning to choose and implement strategies offered examples of the types of implementation strategies and CTE program changes that are developing:

- "[One] department has changed its student recruiting efforts – they are doing activities with younger students, taking activities out to the schools and showing students what they can do, rather than just handing out brochures to high school seniors."
- "We are getting people on the same page with regards to data. Secondary schools collect data differently than postsecondary, and we have been figuring out ways to correlate the two so that we can track students and find out what happens to them."
- "We have achieved buy-in from the secondary state education agency and are currently establishing a partnership with them to provide professional development in the 5-Step Process, and schools are expressing interest in participating."

A number of sites that had implemented strategies reported changes in female participation in STEM courses and activities:

- "When we started [the project], we had zero females in engineering–and we were lucky if we had one–and now we have a design technology class in which 3 of the 7 students are female. We have had a great rise in the number of females taking engineering-related courses. One of the girls in drafting in the engineering department participated in the summer program [that was started through our Pipeline Project work], and changed her schedule to be part of the class."
- "We have had nontraditional welding graduates: a young lady just walked across the stage that we didn't think was going to make it and we are seeing more nontraditional students completing… retention is also up."

- "I think we are at steps 3 and 4: we have increased awareness, and drafting has three more female students enrolling this year than last year."
- "We just had the first female ever apply for the manufacturing program."
- "[One of our feeder high schools had a] STEM-related summer camp in which the number of girls increased as a result of asking the girls personally to participate."

Project Sustainability

Several of the Year 4 interviewees were from five states that had been part of the project since Years 1 and 2. Although they acknowledged that sustaining project efforts had been challenging, given the difficult economic times and budget cuts, all of the interviewees reported continued project-related activities, particularly connected with pilot sites. Project-related activities included meetings of project participants, analyzing data, implementing strategies, and evaluating the 5-Step work already completed. The interviewees noted that continuing support from the project staff had helped to maintain momentum and sustain project efforts.

Interviewee statements about how the Pipeline Project will continue in their state or site included:

- One state-level participant who described a two-part partnership that the state Pipeline Project team is developing with a state education agency: 1) Schools will be required to use the 5-Step Process to examine data as part of their Perkins application. 2) The project will provide 5-Step training to schools not meeting their negotiated Perkins performance levels for nontraditional participation and completion.
- "There is growing interest in the project from across our region—we have a 10 county area—and several school districts have asked how to get involved. More people across campus also wish to become involved, and it is time to reevaluate and go through the process again."

Quantitative Data Collection and Analysis

In Year 4, the evaluation team continued to gather quantitative data for use in 5-Step Process training and to analyze program outcomes. In the first three years of the project, the research team sought data on the number of participants and completers (or concentrators, depending on data availability)[3] in STEM-related CTE programs statewide. Since the project's focus on working with pilot sites has intensified, data collection has focused on collecting data on programs in districts and postsecondary institutions participating in the pilot site work. The data analysis included in this report reflects the data collected on pilot site programs.

In Year four, the project team worked to collect data from 9 of the 11 project states. In several states, these data are available online (Georgia, Texas postsecondary level, and Wisconsin), and in two other states, at least some of the data were provided by state-level data analysts (Missouri and New Hampshire). In the remaining states, data privacy restrictions did not allow statewide data to be shared online or through state offices. For these states, project facilitators and the evaluation team worked with the pilot site leads to collect data directly from the participating school districts and postsecondary institutions (Iowa, Minnesota, Missouri, Ohio, and Texas secondary data) or partner projects (New Look in Illinois). The number of pilot sites for which data were available, as well as the populations (participants, completers/concentrators) and years for which data available varied from site to site.

[3] Except where noted, participants and concentrators are defined in accordance with the non-regulatory guidance on students definitions issued by the Office of Vocational and Adult Education in 2007 (see http://www2.ed.gov/about/offices/list/ovae/pi/memoperkinsiv.html). Completer definitions vary by state and where available, definitions are included in the text.

Table 7: Summary of quantitative data collected in states participating in the STEM Equity Pipeline

Project with pilot site projects for which data were available: Year 4.

State	Data collected
Year 1 states	
Missouri	Participants by gender at Crowder College Technical Education Center (2007-08 through 2009-10) and Brookfield Career Academy (2005-06 through 2010-11)
Illinois	New Look Project final reports from Black Hawk College, Sauk Valley Community College, and Southwestern Community College, 2005-06 through 2010-11.
Year 2 states	
Iowa	Enrollments by gender in computer science courses at Iowa Western Community College, 2007-08 through 2009-10
Wisconsin	Participants by gender in STEM-related CTE programs at Manitowoc, Plymouth, and Sheboygan school districts and at Lakeshore Technical College (2005-06 through 2008-09)
Year 3 states	
New Hampshire	Participants and completers by gender at Milford High School and Applied Technology Center (2007-08 through 2009-10) and participants and concentrators by gender at White Mountains Community College (2007-08 and 2009-10)
Ohio	Participants in STEM-related CTE programs by gender at Cincinnati State Technical Community College (2007-08 through 2009-10)
Year 4 states	
Georgia	2007-08 participants and 2008-09 and 2009-10 participants and completers by gender for all 4 postsecondary pilot sites
Texas	Participants by gender in STEM-related CTE programs that are the focus of pilot site efforts at Texas State Technical College- Waco, Alvin Community College, and Amarillo College (2007-08 through 2009-10)

The data analysis does not include California or Minnesota. In California, statewide data are available, but the state team's system-wide approach to 5-Step Process training left them unable to identify specific sites for which outcomes could be investigated. Training has occurred at numerous sites across the state, but few of the participating districts and community colleges have had adequate follow-up training to fully implement the 5-Step Process. The team has plans

to establish closer partnerships with a small number of school districts though their new partnership with the California Department of Education in the coming year. Once these sites are established, data from the participating districts will be gathered and outcomes investigated over time. In Minnesota, privacy concerns prevented the sharing of data at the state level, and the Pipeline Project team is still working to collect multi-year data from the districts participating in pilot site work for the final report in the coming year.

The analysis of multi-year data reveals several programs with increases in the number of females participating and concentrating/completing at districts and postsecondary schools participating in pilot sites. For example, the available pilot site data from Missouri indicates that one site, Brookfield Career academy, has had growth in the number of females participating in Agriculture. About 9 percent of students in this program were women in 2005-06 and 33 percent in 2011-11, and the number of women increased from 4 to 20. Similar gains were seen at Sheboygan school district in Wisconsin, where the number of females participating in Vehicle and Mobile Equipment Mechanics and Repairers grew from 7, or 12 percent, in 2005-06 to 21, or 36 percent in 2008-09 (the most recent year of data available).

In the majority of programs analyzed, the number of females both increased and decreased over time, and the volatility in the number (and percentage) of female participants and completers made trend detection difficult. The number and percentage of females in many of the individual programs, and overall among the programs for which multi-year data were available, varied—and sometimes widely—from year to year. Several factors related to the programs and available data make it difficult to detect and interpret changes over time:

- *Program enrollments are volatile:* Multi-year baseline data (for example, see data for Georgia in table 8) indicate that female participation rates varied widely before the sites joined the project, and the volatility in numbers is likely to continue due to factors unrelated to project activities.
- *Data availability can be limited:* The data needed to assess outcomes over time is unavailable or only partially available in a number of the sites. Data at some sites and

programs, such as Iowa Western Community College, is only available for the years since the college joined the project and does not include baseline data.

Moreover, the multi-year data analysis conducted in Year 4 revealed a number of limitations in the program-level data collected at both the local and state levels. These limitations, which may undermine data quality and complicate the analysis of programs outcomes, include:

- *Inconsistencies or changes in data collection:* In several states, program identification varied, in terms of both program titles and the assignment of 6-digit CIP codes from year to year, within states, and sometimes even within the same district institution. These differences make it difficult to follow program enrollments over time.
- *Changes in data systems*: Over the course of the project, several states have changed the ways they collect data, and these changes have limited multi-year comparisons in these states. Changes may also undermine short-term data quality as the changes are integrated into the existing system and analysts learn the new practices.
- *Discrepancies between state-level and pilot site data*: District- and institution-level project participants have noted that the data on nontraditional participation in their CTE programs does not match what they see and know about their own programs. In some cases, the cause was the improper calculation on nontraditional participation rates at the state level, or incorrect coding of data submitted by the state. In several states, the state has implemented, or is in the process of implementing, changes to the data system to improve data consistency and quality.

Given the limitations of the program-level data as a means for assessing project outcomes, the project staff and evaluation team have combined a number of strategies for assessing program outcomes. These include the pre- and post-pilot site participation surveys instituted in Year 4 and interview questions asking program participants about program outcomes at their sites. The participant interviews provided a number of insights regarding the evaluation of program outcomes, including the interpretation of quantitative data, for the Pipeline Project.

- *The 5-Step Process takes time*: Interview data indicates that although 5-Step Process implementation moves more quickly in the pilot sites than the state level, two years are generally needed to identify root causes and then choose and implement strategies. These strategies may then require additional time to be fully implemented and to meet expectations regarding changes in participation rates.
- *Strategies vary in effectiveness:* The 5-Step Process is exploratory and iterative, and the first strategies chosen by a site may not be effective for increasing female involvement in STEM-related programs. The teams then reassess their efforts and try different strategies that may be more successful in the second round.
- *Available data may not reflect program goals:* Most of the data that states and sites have been able to provide has been on participants. Some sites, however, are focusing on retaining females who enroll, or else also have retention as one of their goals. Data on completers is available in some sites and could assist in analyzing changes in retention rates, but ideally assessing retention would be done with longitudinal data that tracks female and male students over time.

The above points caution against an over-reliance on quantitative data alone and indicate that program outcomes will best be tracked using a multi-pronged approach, that includes a number of data collection strategies. Moreover, work with the pilot sites has suggested potential new sources of quantitative data, including enrollment information for gateway courses, completion rates of math remedial courses at the postsecondary level, and data tracking individual students, that may provide more comprehensive outcome information in the coming years.

The following section outlines the quantitative data collected from each site, and the results of the data analysis.

Georgia

Georgia joined the project in Year 4, and baseline data has been gathered from all of the postsecondary pilot sites participating in the project for the years 2007-08 (participants) and 2008-09 and 2009-10 (participants and completers). Data from these sites is available for all of

the STEM-related CTE programs associated with occupations nontraditional for females that the institutions offer; table 8 presents programs for which multi-year data were available. Since the project is new and the sites' strategies have not been implemented yet, these data will be compared with data for the coming years to explore program impacts on female participation and completion rates.

Table 8: Total and female participation rates in STEM-related CTE programs associated with occupations nontraditional for females in Georgia pilot sites: 2007-08 (participants only), 2008-09, and 2009-10

	2007-08			2008-09						2009-10					
	Participants			Participants			Completers			Participants			Completers		
Atlanta Tech	Female	Total	% Female	Female	Total	% Female	Female	Total	% female	Female	Total	% Female	Female	Total	% female
Air Conditioning Technology	3	159	2%	8	214	4%	2	94	2%	7	265	3%	4	77	5%
Auto Collision Repair	3	107	3%	5	76	7%	2	41	5%	5	85	6%	1	19	5%
Automotive Technology	17	174	10%	15	186	8%	5	62	8%	17	228	7%	10	78	13%
Aviation Maintenance Technology	18	185	10%	18	179	10%	0	12	0%	21	236	9%	6	36	17%
Carpentry	21	92	23%	23	80	29%	3	14	21%	28	112	25%	5	15	33%
Computer Information Systems	117	289	40%	105	297	35%	16	37	43%	98	322	30%	11	28	39%
Diesel Equipment Technology	3	47	6%	3	59	5%	0	13	0%	4	90	4%	1	25	4%
Drafting	19	62	31%	12	50	24%	0	0	0%	10	48	21%	5	52	10%
Electrical Construction and Maintenance	7	125	6%	11	155	7%	2	39	5%	9	205	4%	0	0	0%
Electronics and Telecommunications	3	31	10%	4	41	10%	0	0	0%	5	52	10%	0	0	0%
Fire Science Technology	1	13	8%	1	19	5%	0	0	0%	8	74	11%	0	0	0%
Plumbing	1	30	3%	0	26	0%	0	10	0%	3	48	6%	0	10	0%
Welding and Joining Technology	6	34	18%	5	36	14%	0	0	0%	5	58	9%	1	13	8%
Total	**219**	**1348**	**16%**	**210**	**1418**	**15%**	**30**	**322**	**9%**	**220**	**1823**	**12%**	**44**	**353**	**12%**

	2007-08 Participants			2008-09 Participants			2008-09 Completers			2009-10 Participants			2009-10 Completers		
	Female	Total	% Female	Female	Total	% Female	Female	Total	% female	Female	Total	% Female	Female	Total	% female
Augusta Tech															
AAS-Technical Studies	2	20	10%	3	26	12%	3	11	27%	2	16	13%	0	0	0%
Air Conditioning Technology	3	100	3%	1	85	1%	1	31	3%	1	135	1%	0	23	0%
Automotive Technology	4	21	19%	12	140	9%	0	48	0%	12	146	8%	5	68	7%
Chemical Operations Technology	4	28	14%	4	24	17%	0	0	0%	0	0	0%	0	0	0%
Computer Information Systems	160	544	29%	173	573	30%	23	92	25%	148	567	26%	28	119	24%
Drafting	15	64	23%	16	61	26%	3	17	18%	12	54	22%	0	0	0%
Electrical Construction and Maintenance	13	255	5%	12	229	5%	1	42	2%	10	233	4%	2	34	6%
Electronics and Telecommunications	4	54	7%	4	49	8%	0	0	0%	5	57	9%	0	0	0%
Electronics-Computer Engineering Technology	9	64	14%	12	61	20%	0	0	0%	9	81	11%	0	0	0%
Environmental Horticulture	10	31	32%	22	60	37%	0	0	0%	23	64	36%	0	10	0%
Fire Science Technology	9	48	19%	4	46	9%	1	17	6%	2	46	4%	1	10	10%
Industrial Systems Technology	9	140	6%	14	184	8%	2	33	6%	12	188	6%	3	55	5%
Machine Tool Technology	3	24	13%	2	22	9%	1	16	6%	0	26	0%	0	14	0%
Mechanical Engineering Technology	8	49	16%	5	45	11%	0	0	0%	6	48	13%	0	0	0%
Welding and Joining Technology	8	114	7%	6	102	6%	7	76	9%	9	115	8%	5	74	7%
Total	**261**	**1556**	**17%**	**290**	**1707**	**17%**	**15**	**383**	**4%**	**251**	**1776**	**14%**	**44**	**407**	**11%**

	2007-08 Participants			2008-09 Participants			2008-09 Completers			2009-10 Participants			2009-10 Completers		
	Female	Total	% Female	Female	Total	% Female	Female	Total	% female	Female	Total	% Female	Female	Total	% female
Heart of Georgia Tech															

Air Conditioning Technology	1	59	2%	0	59	0%	0	11	0%	1	79	1%	1	20	5%
Auto Collision Repair	0	67	0%	0	55	0%	0	12	0%	0	59	0%	0	0	0%
Automotive Technology	2	122	2%	3	112	3%	0	0	0%	5	125	4%	0	10	0%
Carpentry	0	74	0%	0	67	0%	0	0	0%	0	66	0%	0	0	0%
Computer Information Systems	222	300	74%	165	328	50%	5	17	29%	31	301	10%	0	13	0%
Diesel Equipment Technology	3	32	9%	3	37	8%	2	19	11%	1	38	3%	1	12	8%
Drafting	8	29	28%	6	33	18%	0	0	0%	4	23	17%	0	0	0%
Electronics and Telecommunications	15	173	9%	12	176	7%	4	43	9%	21	170	12%	3	14	21%
Environmental Horticulture	1	46	2%	0	60	0%	0	0	0%	0	54	0%	0	0	0%
Industrial Systems Technology	2	18	11%	0	17	0%	0	0	0%	1	14	7%	0	0	0%
Machine Tool Technology	1	37	3%	1	43	2%	0	0	0%	1	38	3%	0	0	0%
Welding and Joining Technology	2	84	2%	1	71	1%	0	22	0%	3	92	3%	0	20	0%
Total	**257**	**1041**	**25%**	**191**	**1058**	**18%**	**11**	**124**	**9%**	**12**	**1059**	**3%**	**5**	**89**	**6%**

	2007-08 Participants			2008-09 Participants			2008-09 Completers			2009-10 Participants			2009-10 Completers		
	Female	Total	% Female	Female	Total	% Female	Female	Total	% female	Female	Total	% Female	Female	Total	% female
Middle Georgia Tech															
AAS-Technical Studies	n/a	n/a	n/a	11	23	48%	0	0	0%	7	23	30%	0	0	0%
Air Conditioning Technology	0	55	0%	1	55	2%	0	38	0%	1	95	1%	0	17	0%
Aircraft Structural Technology	40	236	17%	56	257	22%	13	48	27%	83	493	17%	8	41	20%
Automotive Technology	6	99	6%	4	92	4%	0	0	0%	7	110	6%	1	30	3%
Aviation Maintenance Technology	16	151	11%	14	144	10%	0	0	0%	18	170	11%	1	14	7%
Computer Information Systems	111	299	37%	114	344	33%	13	53	25%	117	393	30%	10	52	19%
Drafting	16	69	23%	15	58	26%	0	0	0%	10	48	21%	4	15	27%
Electronics and Telecommunications	82	372	22%	84	339	25%	15	65	23%	129	502	26%	23	67	34%
Industrial Systems Technology	2	72	3%	7	84	8%	0	12	0%	9	112	8%	4	33	12%
Machine Tool Technology	2	44	5%	2	39	5%	0	0	0%	5	55	9%	0	0	0%

Welding and Joining Technology	7	67	10%	2	53	4%	1	27	4%	1	69	1%	0	29	0%
Total	**282**	**1464**	**19%**	**310**	**1488**	**21%**	**42**	**243**	**17%**	**387**	**2070**	**19%**	**51**	**298**	**17%**

The percentage of female participants and completers in the programs that are the focus of the pilot sites' work are generally 20 percent or below, depending on the year. For example, at Augusta Tech, which is focusing on engineering programs, the number of female participants in Electronics-Computer Engineering Technology ranged from 9 (14 percent) in 2007-08 to 12 (20 percent) in 2008-09, to 9 again (11 percent) in 2009-10. Heart of Georgia Tech is concentrating its Pipeline work on Electronics and Telecommunications. From 12 to 21 women participated in this program in the three years of data available, representing from 7 to 12 percent of all participants.

Illinois

Because of data privacy concerns, statewide program-level data on female enrollments in CTE programs by district and postsecondary institution are not available in Illinois. The project has worked closely with the New Look project in the state, and efforts to increase the number of females in STEM-related CTE programs are underway at a number of New Look sites. The New Look team identified three community colleges–Black Hawk College, Sauk Valley Community College, and Southwestern Community College–as pilot sites, and these sites' final New Look reports are the source of the data reported here.[4] The project teams at these institutions have been trained in the 5-Step Process and are using the process to select, implement, and evaluate strategies to increase the number of females in nontraditional occupations, and the data presented here are drawn from the final reports submitted by the sites from 2005-06 through 2010-11.

[4] The evaluation team reviewed a total of 12 annual reports from 2005-06 to 2010-11 were retrieved June 20, 2011 from http://icsps.illinoisstate.edu/newlook/showcase/index.html. Not all sites have reports in each year.

The information included in the annual reports has some limitations. Each project identifies some long-term goals (generally 5 years, but sometimes shorter) for the percentage of students enrolled in programs nontraditional for their gender. Unfortunately, the final report template requests participants to report only on the preceding year's outcomes, and the results generally do not include data on progress towards long-term goals. In the coming year, the evaluation team will follow up with all three sites for updates and to request additional information.

In 2005-06, the "Focus on Nontraditional Careers Program" at Southwestern Community College set an initial long-term goal to increase the number of students enrolled in nontraditional programs with respect to gender. The 2005-06, 2006-07, 2007-08 annual reports include descriptions of activities including workshops on nontraditional careers and mentoring programs for high school and college students. Evaluation data included in the reports indicate that participants left the sessions with greater knowledge of and interest in careers that are nontraditional for their gender.

In 2009-10, Sauk Valley Community College completed the 5th year of a project entitled "Women in Engineering." In each of the five years, this project has offered a "Women in Engineering Day" that provides information on engineering careers to high school girls that includes speakers, and provides marketing materials on engineering careers aimed at females. Some 23 girls participated in the day in 2007, 12 in 2008, 35 in 2009, and 21 in 2010, and the event evaluations consistently indicated that the experience was reviewed favorably by participants. The project has a long-term goal to increase the number of females in Sauk's engineering program, but the reports do not address the status of that goal.

Iowa

Iowa joined the project in Year 2 and provided baseline data on participant and concentrator data for 2006-07 and 2007-08. Unfortunately, restrictions on data sharing due to privacy concerns prevented the state agencies from sharing the same data for subsequent years. During Year 4, the state facilitator contacted three of the four primary pilot sites to collect information on females in their CTE programs. Indian Hills Community College was not contacted because they are primarily working with younger (middle school or earlier) students.

Data were submitted by Hawkeye Community College and Iowa Western Community College. The data request with Kirkwood Community College is pending. Hawkeye Community College submitted data on the numbers of degrees awarded by gender in various fields, and the evaluation team is currently working with the college to collect data for multiple years and to identify the fields that are nontraditional for women. Iowa Western Community College submitted 2007-08, 2008-09, and 2009-10 fall enrollment information for classes in the program that the college is focusing on: computer science. Table 9 includes the courses for which multi-year data were available.

Table 9: Total and female fall enrollments in computer science courses for which three years of data are available at Iowa Western Community College: 2007-08, 2008-09, and 2009-10

	2007-08			2008-09			2009-10		
Programs	**Total**	**Female**	**% female**	**Total**	**Female**	**% female**	**Total**	**Female**	**% female**
Intro to Info Technology	79	15	19%	63	11	17%	81	15	19%
Comp Webpage Design Software	44	17	39%	36	13	36%	35	18	51%
Fundamentals Web Programming	55	17	31%	53	13	25%	51	21	41%
Visual Basic NET I	30	7	23%	2	0	0%	33	4	12%
Introduction to Computers	437	211	48%	502	250	50%	499	229	46%
CCNA Discovery 1	8	1	13%	15	0	0%	6	1	17%
CCNA Exploration 1	27	3	11%	20	3	15%	34	7	21%
LINUX Network Administration	24	1	4%	17	3	18%	27	6	22%
Fundamentals of Desktop Suppor	3	1	33%	26	4	15%	4	1	25%
PC Support 1	35	3	9%	70	13	19%	34	4	12%
Computer Internship	4	2	50%	7	0	0%	9	2	22%
Total	**773**	**299**	**39%**	**855**	**340**	**40%**	**835**	**319**	**38%**

Overall, about 40 percent of students in these classes are female in each of the three years. The classes with the highest numbers and percentages of females are Introduction to Computers (about 48 percent) and Computer Webpage Design Software (from 36 to 51 percent). Over the years analyzed, the number and percentage of females in two of three of classes that started out with fewer than 25 percent females enrolled increased. Females accounted for 11 percent of enrollments in CCNA Exploration 1 in 2007-08, and 21 percent in 2009-1, and the number grew from 3 to 7. A similar change was seen for LINUX Network Administration. The number of females enrolled in PC Support 1, jumped from 9 to 19 percent between the first and second years but fell to 12 percent in 2009-10.

Missouri

Missouri has been part of the project since the first year and has provided statewide data for both evaluation and training purposes. In working with the data for nontraditional students both for this project and for other activities, members of the project team and their colleagues discovered that nontraditional students were not being accurately flagged in the CTE data system. As a result, the statewide data underestimated the number of nontraditional students enrolling in STEM-related courses in other programs. A correction to the data collection system has been instituted, and the data should more accurately reflect enrollment numbers in the coming years. Until several years of the corrected data are available, project participants are using data from their own sites for training and to analyze outcomes and sharing these data with the evaluation team as well. Data availability is limited; data are not available for all of the sites, and the years and types of data available vary among the sites for which data are available.

Table 10 presents data on secondary students at two Missouri pilot sites for which multi-year data are available: Brookfield Career Academy (total and female completers from 2005-06 through 2010-11) and Crowder College Technical Education Center (total and female fall enrollments from 2007-08 through 2009-10).

Table 10: Data on female participants in STEM-related CTE programs in two Missouri pilot sites: Brookfield Career Academy (2005-06 to 2010-11) and Crowder College Technical Education Center (2007-08 to 2009-10)

Brookfield Career Academy: Total and female completers in STEM-related CTE programs

	2005-06			2006-07			2007-08		
	total	female	% female	total	female	% female	total	female	% female
Auto Mechanics	13	2	15%	8	1	13%	15	1	7%
Building Trades	12	0	0%	10	0	0%	9	0	0%
CompNetworking	13	0	0%	13	0	0%	36	0	0%
Drafting	10	3	30%	8	2	25%	19	1	5%
Welding	15	0	0%	16	0	0%	10	0	0%
Agriculture	43	4	9%	35	5	14%	91	16	18%
	106	9	8%	90	8	9%	180	18	10%

	2008-09			2009-010			2010-11		
	total	female	% female	total	female	% female	total	female	% female
Auto Mechanics	12	0	0%	20	4	20%	21	1	5%
Building Trades	4	0	0%	14	0	0%	20	0	0%
CompNetworking	17	0	0%	35	1	3%	31	2	6%
Drafting	6	1	17%	14	1	7%	5	1	20%
Welding	18	0	0%	24	0	0%	21	0	0%
Agriculture	82	17	21%	78	20	26%	61	20	33%
	139	18	13%	185	26	14%	159	24	15%

Crowder College Technical Education Center: Total and female fall enrollments in STEM-related CTE Programs

	2007-08			2008-09			2009-10		
Course	total	female	% female	total	female	% female	total	female	% female
Auto Technology	31	1	3%	32	1	3%	35	2	6%
Building Trades	17	0	0%	25	0	0%	27	0	0%
Collision Repair	24	0	0%	28	1	4%	27	2	7%
Computer Tech	31	3	10%	23	1	4%	28	1	4%
Green Tech	8	1	13%	11	1	9%	10	2	20%
Diesel Technology	13	1	8%	15	0	0%	24	0	0%
Welding	27	0	0%	27	0	0%	24	2	8%
	151	6	4%	161	4	2%	175	9	5%

The results indicate that the two sites experienced modest but steady increases in the number of females completing and enrolling in STEM-related CTE programs over the years analyzed. At Brookfield Career Academy, the percentage of females among completers of STEM-related CTE programs grew from about 9 percent in 2006-06 to about 15 percent in 2010-11. Much of the change was driven by the program with the largest gain, Agriculture; about 9 percent of completers in this program were female in 2005-06, and about 33 percent in 2010-11. The numbers of females enrolling in any of the STEM-related CTE programs at Crowder College are small (none of the programs enrolled over 3 in any of the years analyzed), but increased to 9 in 2009-10, up from 6 and 4 in 2007-08 and 2008-09, respectively.

New Hampshire

New Hampshire state data analysts provide statewide data on secondary enrollments and completers for 2007-08, 2008-09, and 2009-10, and on postsecondary participants and concentrators for 2007-08 and 2009-10 (data for 2008-09 was not available).[5] The secondary data presented here are for the Milford High School and Applied Technology Center pilot site, and the postsecondary data are for the White Mountain Community College pilot site.[6]

[5] In New Hampshire, a secondary completer is defined as A CTE completer at the secondary level is a student who has completed 90 percent of the approved program competencies with a score of 3 (proficient) or better.

[6] New Hampshire has one additional secondary pilot site at Sugar River Valley Technical Center in Claremont, NH. The project anticipates obtaining data for this site in the next few months.

Table 11: Total and female participants and completers in selected New Hampshire pilot sites: 2007-08 to 2009-10 (secondary) and 2007-08 and 2009-10 (postsecondary)

	2007-08					
	Participants			Completers		
	Total	Female	% female	Total	Female	% female
Milford High School and Applied Technology Center						
Radio and Television Broadcasting Technology	38	13	34%	7	3	43%
Graphic and Printing Equipment Operator	44	22	50%	20	12	60%
Computer Systems Networking and Telecommunications	49	11	22%	6	1	17%
Engineering Technology, General	33	5	15%	12	1	8%
Biotechnology	21	11	52%	3	1	33%
Building Trades	40	1	3%	17	0	0%
Machine Shop Technology/Assistant	31	1	3%	7	0	0%
Total	**256**	**64**	**25%**	**72**	**18**	**25%**

	2008-09					
	Participants			Completers		
	Total	Female	% female	Total	Female	% female
Milford High School and Applied Technology Center						
Radio and Television Broadcasting Technology	26	11	42%	5	0	0%
Graphic and Printing Equipment Operator	36	18	50%	6	5	83%
Computer Systems Networking and Telecommunications	14	4	29%	2	0	0%
Engineering Technology, General	23	5	22%	8	1	13%
Biotechnology	25	13	52%	6	2	33%
Building Trades	37	0	0%	10	0	0%

Machine Shop Technology/Assistant	29	2	7%	3	0	0%
Total	**190**	**53**	**28%**	**40**	**8**	**20%**

	2009-10					
	Participants			Completers		
	Total	Female	% female	Total	Female	% female
Milford High School and Applied Technology Center						
Radio and Television Broadcasting Technology	20	6	30%	8	4	50%
Graphic and Printing Equipment Operator	34	15	44%	10	4	40%
Computer Systems Networking and Telecommunications	7	1	14%	1	1	100%
Engineering Technology, General	41	6	15%	6	1	17%
Biotechnology	53	35	66%	6	4	67%
Building Trades	65	2	3%	9	0	0%
Machine Shop Technology/Assistant	38	1	3%	8	0	0%
Total	**258**	**66**	**26%**	**48**	**14**	**29%**

Postsecondary

	2007-08					
	Participants			Concentrators		
White Mountains Community College	Total	Female	% female	Total	Female	% female
Automotive Technology	27	3	11%	6	1	17%
Cartography	27	9	33%	7	3	43%
Diesel Mechanics	30	1	3%	2	0	0%
Computer Information Systems	24	2	8%	2	0	0%
Welding Technology	n/a	n/a		n/a	n/a	
Total	**108**	**15**	**14%**	**17**	**4**	**24%**

White Mountains Community College	2009-10 Participants			2009-10 Concentrators		
	Total	Female	% female	Total	Female	% female
Automotive Technology	33	0	0%	13	0	0%
Cartography	31	13	42%	5	3	60%
Diesel Mechanics	29	0	0%	3	0	0%
Computer Information Systems	37	8	22%	5	0	0%
Welding Technology	13	3	23%	8	3	38%
Total	**143**	**24**	**17%**	**34**	**6**	**18%**

Source: New Hampshire Department of Education and Community College System

The number and percentage of females in STEM-related CTE programs at Milford vary by year and program. The only trends found are for Biotechnology (the number and percentage of females among participants and completers increased from 2007-08 to 2009-10) and for Graphic and Printing Equipment (the number and percentage of females among participants and completers decreased from 2007-08 to 2009-10). Although the percentage of completers in Engineering Technology that were female grew from 2007-08 to 2009-10, the change was driven by a decrease in the number of male completers.

Ohio

Ohio joined the project in Year 3. Data privacy restrictions prevent the collection of data from state-level sources, and efforts are currently underway to collect baseline and outcome data on female participants and completers in STEM-related CTE programs from the three pilot sites. The project has successfully collected three years of baseline and outcome data on female participation rates from Cincinnati State Technical and Community College.

Table 12: Participants in STEM-related CTE programs associated with occupations nontraditional for females at Cincinnati State Technical and Community College: 2007-08, 2008-09, and 2009-10

	2007-08			2009-10			2010-11		
	Total	Female	% female	Total	Female	% female	Total	Female	% female
Landscaping and Groundskeeping	108	25	23%	113	29	26%	134	31	23%
Turf and Grass Management	24	1	4%	23	0	0%	26	0	0%
Computer and Information Sciences, General	101	21	21%	91	17	19%	83	18	22%
Artificial Intelligence and Robotics	93	26	28%	97	29	30%	n/a	n/a	n/a
Architectural Engineering Technology/ Technician	102	15	15%	102	13	13%	111	16	14%
Civil Engineering Technology/Technician	287	25	9%	283	26	9%	252	19	8%
Electrical, Electronic & Communications Engineering Technology	112	5	4%	174	14	8%	346	24	7%
Laser and Optical Technology Technician	5	0	0%	1	0	0%	0	0	0%
Electrical & Electronic Engineering Technologies/Technicians, Other	10	1	10%	2	0	0%	0	0	0%
Biomedical Technology/Technician	64	3	5%	77	8	10%	135	12	9%
Electromechanical Technology/Electromechanical Engineering Technology	67	5	7%	70	6	9%	77	2	3%
Environmental Engineering Technology/Environmental Technology	18	4	22%	21	5	24%	40	7	18%
Environmental Control Technologies/Technicians, Other	75	24	32%	100	30	30%	110	29	26%
Plastics Engineering Technology/Technician	5	0	0%	5	0	0%	11	0	0%

Industrial Technology/Technician	51	2	4%	43	1	2%	39	1	3%
Aeronautical/Aerospace Engineering Technology/Technician	67	1	1%	53	2	4%	70	3	4%
Automotive Engineering Technology/Technician	141	10	7%	141	5	4%	245	9	4%
Mechanical Engineering/Mechanical Technology/Technician	196	21	11%	198	22	11%	188	21	11%
Computer Engineering Technology/Technician	257	24	9%	250	13	5%	347	40	12%
Computer Technology/Computer Systems Technology	82	12	15%	81	14	17%	87	14	16%
Engineering Technologies/Technicians, Other	2	0	0%	2	0	0%	1	0	0%
Total	**1867**	**225**	**12%**	**1927**	**234**	**12%**	**2302**	**246**	**11%**

Data on participants in STEM-related CTE programs at Cincinnati State Technical and Community College indicate that about 11-12 percent of participants were female in 2007-08, 2009-10, and 2010-11. None of the programs shown experienced steady increases in the number and percentage of female participants across all three years, but the number of females in Landscaping and Groundskeeping went from 25 in 2007-08 to 31 in 2010-11, and the number in Computer Engineering Technology from 24 in 2009-10 (9 percent) to 40 in 2010-11 (12 percent). More years of data will be needed to determine if these changes represent multi-year trends.

Texas

Texas joined the Project in Year 4 and has pilot sites based at four technical and community colleges. The evaluation team has compiled baseline data for 2007-08, 2008-09, and 2009-10 on female and total student enrollments in the STEM-related CTE programs that are the focus of the

pilot sites' activities at all of the colleges except Clarendon. Clarendon is working with a program that is new in 2010-11, Wind Energy, and baseline data will therefore be collected during the current year and analyzed in Year 5.

Table 13: Total and female participants in target programs in the Texas postsecondary pilot site institutions and statewide: 2007-08 to 2009-10

	2007-08			2008-09			2009-10		
	Total	Female	% female	Total	Female	% female	Total	Female	% female
Texas State Technical College (TSTC)- Waco									
Air Transportation	113	14	12.4	102	9	8.8	111	8	7.2
Vehicle Maintenance and Repair Technologies, General	987	44	4.5	898	28	3.1	1099	38	3.5
Laser and Optical Technology/Technician	74	6	8.1	68	3	4.4	69	6	8.7
Alvin Community College									
Drafting/Design Engineering Technologies/Technicians	21	4	19.1	166	38	22.9	137	30	21.9
Amarillo College									
Drafting/Design Engineering Technologies/Technicians	76	15	19.7	71	12	16.9	67	12	17.9
Clarendon Community College									
Wind Energy[1]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Statewide									
Air Transportation	665	87	13.1	615	69	11.2	690	77	11.2
Vehicle Maintenance and Repair Technologies, General	7673	406	5.3	7532	409	5.4	8443	440	5.2
Laser and Optical Technology/Technician	92	8	8.7	96	7	7.3	119	13	10.9
Drafting/Design Engineering Technologies/Technicians	5175	1152	22.3	5747	1245	21.7	5187	1069	20.6

Source: Texas Higher Education Coordinating Board, http://www.txhighereddata.org/reports/performance/perkdata/perkdata_pdf.cfm?dfice=003634&progyr=2011

[1] New program; first data will be available for the 2010-11 academic year

The percentages of females enrolled in the target programs range from 3.1 percent in Vehicle Maintenance and Repair Technologies at Texas State Technical College (TSTC)–Waco to 22.9 percent in Drafting programs at Alvin Community College. The Texas Higher Education Coordinating Board also provides statewide numbers and averages for benchmarking NTO enrollment progress; the programs targeted by the pilot sites are below the state averages in each year, with the exception of Drafting at Alvin Community College. Female enrollments in this program were slightly above the state average (by about 1 percentage point) in 2008-09 and 2009-10.

The colleges are also planning to partner with local secondary school programs and work together to devise strategies designed to increase female enrollments in the target programs. The state facilitator will be working with the secondary sites to determine the best way to collect data on their programs in the coming year.

Wisconsin

The pilot site at Lakeshore Technical College in Wisconsin has worked with three local school districts, Manitowoc, Plymouth, and Sheboygan, to work through the 5-Step Process and participate in Pipeline Project activities. The activities focused on increasing female enrollment in STEM-related CTE programs, and specific events targeted recruitment for engineering classes and welding programs, among others.[7]

Secondary program enrollment data by gender at the three districts was available for selected programs from 2005-06 to 2008-09, and the analysis presented in table 14 includes programs for which multi-year data were available. Data for the number of female enrollees and graduates were available for an additional year from Lakeshore Technical College, and the evaluation team

[7] Karen Showers, Judy Stanton, Patti Saunders, and Kari Krull, "Nontraditional Occupations and STEM: Exploring the interrelationship, with examples of supportive strategies," presentation at the STEM Equity Pipeline Project Leadership Institute, Crystal City, VA, April 12, 2011.

compiled college data for 2005-06 through 2009-10. The analyses of these data included programs with at least 10 enrollees in 2010 and for which at least 3 years of data were available.

Although pilot site participants reported increases in the interest and awareness among girls in STEM careers in their onsite surveys and event evaluations,[8] as well as upticks in the number of girls taking engineering and other classes, and these differences have not yet been reflected in the STEM-related CTE program level data. The changes reported by the participants are small and include involvement in gateway courses and co-curricular activities, for which data are not available.

Table 14: Total and female participants in selected STEM-related CTE programs at the Wisconsin secondary school pilot sites of Manitowoc, Plymouth, and Sheboygan: 2005-06 to 2008-09

	2005-06			2006-07			2007-08			2008-09		
	female	total	% female	female	total	% female	female	total	% female	female	total	% female
Manitowoc												
Electrical and Electronic Engineering, Technical	0	24	0%	0	2	0%	1	11	9%	1	22	5%
Vehicle & Mobile Equipment Mechanics & Repairers	3	35	9%	5	48	10%	0	29	0%	6	44	14%
Precision Metal Workers	0	2	0%	1	9	11%	1	4	25%	0	11	0%
Woodworkers	4	72	6%	6	61	10%	0	3	0%	2	13	15%
Total	**7**	**133**	5%	**12**	**120**	10%	**2**	**47**	4%	**9**	**90**	10%
Plymouth												
Architectural Engineering, Technical	2	3	67%	0	1	0%	0	3	0%	0	2	0%
Electrical and Electronic Engineering, Technical	1	1	100%	0	2	0%	0	5	0%	n/a	n/a	n/a
Carpenters	0	6	0%	0	2	0%	0	7	0%	1	5	20%
Construction and Building Finishers	0	3	0%	0	5	0%	0	1	0%	1	5	20%

[8] Ibid.

Construction trades, other	0	4	0%	1	3	33%	0	4	0%	n/a	n/a	n/a
Electrical and Electronics Equipment Workers	0	1	0%	0	3	0%	n/a	n/a	n/a	0	1	0%
Vehicle & Mobile Equipment Mechanics & Repairers	0	16	0%	0	11	0%	0	12	0%	0	14	0%
Graphic and printing equipment operators	3	4	75%	3	5	60%	3	3	100%	2	8	25%
Precision Metal Workers	1	9	11%	0	2	0%	0	1	0%	2	7	29%
Woodworkers	0	1	0%	0	1	0%	0	3	0%	0	1	0%
Air transportation workers	1	1	100%	n/a	n/a	0%	0	1	0%	1	2	50%
Total	**9**	**50**	18%	**4**	**35**	11%	**3**	**43**	7%	**7**	**45**	16%
Sheboygan												
Electrical and Electronics Equipment Workers	9	17	53%	9	18	50%	11	15	73%	4	7	57%
Vehicle & Mobile Equipment Mechanics & Repairers	7	59	12%	4	53	8%	11	56	20%	21	58	36%
Graphic and printing equipment operators	29	68	43%	43	83	52%	28	61	46%	24	54	44%
Precision Metal Workers	0	47	0%	7	48	15%	7	41	17%	11	42	26%
Woodworkers	7	76	9%	7	67	10%	5	52	10%	6	52	12%
Total	**52**	**267**	19%	**70**	**269**	26%	**62**	**225**	28%	**66**	**213**	31%

Source: Wisconsin Department of Public Instruction, http://dpi.wi.gov/cte/veersprofile.html

At the secondary level, overall female enrollments varied across the districts and from year to year. In terms of numbers of females enrolled overall, only Sheboygan had a consistent increase across the years, and the number of females participating in the programs analyzed went from 52 in 2006-06 to 66 in 2008-09. The corresponding percentages rose from 19 to 31 percent over the same time period. In terms of programs, much of the increase is attributable to Vehicle and Mobile Equipment Mechanics repair (11.9 and 36.2 percent in 2005-06 and 2008-09, respectively) and Precision Metal Workers (0 and 26.2 percent in 2005-06 and 2009-10, respectively).

Table 15: Total and female participants at the Wisconsin postsecondary pilot site at Lakeshore Technical College in STEM-related CTE programs with 10 or more enrollees in 2009-10, and for which 3 or more years of data were available: 2005-06 through 2009-10

	2005-06			2006-07			2007-08			2008-09			2009-10		
Program	total	female	% female	total	female	% female	total	female	% female	total	female	% female	total	female	% female
AUTO COLLISION REPAIR & REFINISH TECHNICIAN	25	0	0%	21	0	0%	24	1	4%	22	2	9%	23	2	9%
AUTOMOTIVE MAINTENANCE TECHNICIAN	38	1	3%	39	2	5%	34	2	6%	44	2	5%	38	3	8%
ELECTRO-MECHANICAL TECHNOLOGY	78	5	6%	92	5	5%	103	7	7%	98	3	3%	83	1	1%
FARM BUSINESS & PRODUCTION MANAGEMENT	156	29	19%	131	19	15%	129	15	12%	109	15	14%	119	23	19%
INDUSTRIAL ELECTRICIAN APPRENTICE	33	0	0%	45	0	0%	50	0	0%	50	0	0%	53	0	0%
INDUSTRIAL MECHANIC	43	3	7%	36	2	6%	32	1	3%	38	3	8%	32	3	9%
IT-COMPUTER SUPPORT SPECIALIST	23	6	26%	35	12	34%	36	13	36%	59	13	22%	67	18	27%
IT-NETWORK SPECIALIST	73	13	18%	65	10	15%	78	11	14%	89	10	11%	114	14	12%
MACHINE TOOL OPERATION	44	6	14%	44	6	14%	55	10	18%	54	8	15%	59	10	17%
MACHINIST APPRENTICE	18	0	0%	17	1	6%	17	1	6%	18	2	11%	20	0	0%
MAINTENANCE MECHANIC/MILL WRIGHT APPRENTICE	44	0	0%	57	0	0%	65	0	0%	67	0	0%	58	0	0%
MECHANICAL DESIGN TECHNOLOGY	68	8	12%	70	12	17%	68	9	13%	70	8	11%	63	5	8%
NUCLEAR TECHNOLOGY	n/a	n/a	n/a	44	30	68%	39	23	59%	45	15	33%	83	28	34%
PLUMBING APPRENTICE (JAC)	25	0	0%	22	0	0%	23	0	0%	17	0	0%	12	0	0%
QUALITY ASSURANCE TECHNICIAN	21	6	29%	20	7	35%	15	7	47%	1	0	0%	37	14	38%
SHEET METAL CONSTRUCTION	20	0	0%	18	0	0%	15	0	0%	14	0	0%	16	0	0%
WELDING	16	1	6%	26	5	19%	41	4	10%	59	4	7%	65	2	3%

WELDING/MAINTENANCE & FABRICATION	16	1	6%	17	0	0%	15	0	0%	13	2	15%	26	2	8%
Total	**741**	**79**	11%	**799**	**111**	14%	**839**	**104**	12%	**867**	**87**	10%	**968**	**125**	13%

Source: Wisconsin Technical College System, http://systemattic.wtcsystem.edu/reports/Perkins_index.htm

At the postsecondary level, the number and percentage of female students enrolled in the programs analyzed varied from year to year and only IT-Computer Support Specialist program showed a steady increase over all five years, from 6 female students in 2005-06 to 18 in 2009-10. However, since overall enrollments in the program grew as well, the percentage change was just one point, from 26 to 27 percent.

STEM Equity Pipeline Project
Five-Step Program Improvement Process Training
Georgia Pilot Sites
November 16, 2010 Survey Results

INTRODUCTION

The state facilitator for Georgia, Claudia Morrell, held a meeting for the team on November 16, 2010 at the Southwest Georgia Technical College in Thomasville, GA. The session focused on providing training on all steps of the Five-Step Program Improvement Process. Twenty-two state-level staff and pilot site participants attended the session.

At the end of the meeting, participants were asked to evaluate the session by competing a brief, anonymous survey. The survey included 10 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A. Out of the 22 people that attended the session, 19 completed the survey.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. All respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.6). They also strongly agreed that the materials provided were useful for learning what they need to know and do (average rating 3.7).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about the Five-Step Process. Again, responses were mostly positive. Participants all agreed that they understand the components of the Five-Step Process and will be able to implement the process at their pilot sites (average rating 3.4). They also agreed that in general they understand the process of Documenting Performance Results using CTE data (average rating 3.4).

When asked if they felt they had an improved understanding of root causes and how to address them in their work, all participants strongly agreed or agreed (average rating 3.5). The participants also strongly agreed that they understand the importance of identifying root causes affecting their students before selecting a strategy, and that they know where to find resources to help them implement an effective strategy based on the identified root causes (average rating 3.6, each).

In regards to their future work, participants agreed that they are able to write clearly measurable objectives for both formative and summative outcomes (average rating 3.3). They also felt that they improved their skills in developing implementation plans that can help them track their progress and meet their objectives (average rating 3.3). Lastly, participants agreed that they have ideas about how they can use what they learned in the training in their work with their pilot sites (average rating 3.3).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. Eleven of the participants provided a response. Several respondents mentioned creating and conducting a survey. They also mentioned sharing the information with their schools. Selected responses are listed below:

- I will browse different hyperlinks regarding strategies and evaluation surveys.
- Review all procedures as related to non-traditional students and implement.
- Pull additional data to help better determine root causes
- Review the assessments and other tools that can be used in conjunction with surveys.
- To increase the awareness of gender bias through the use of the Project Implicit Test during Strategic Planning.
- Will distribute staff developments and collaborate with engineering instructors.
- Survey, look at numbers for female participation over last 5 years.
- Spend a lot of time looking at www.stemequitypipeline.org

Participants were also asked what they still have questions or are unsure about. A few participants mentioned that they needed to digest the information before responding. One participant mentioned being unsure about the development of the survey. Lastly, participants were asked for any additional comments. Several participants commented on how much they enjoyed the training, saying it was clear, informative and well organized.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was organized and that the materials would be useful. It gave participants a better understanding of the Five-Step Process, accountability data, and root causes. In addition, participants left the session with an understanding of how to write their objectives and develop their implementation plan, as well as ideas of what to do next at their pilot sites.

GA State Team
STEM Effective Practice Workshop
May 10-11, 2011 Survey Results

INTRODUCTION

The state facilitator for Georgia, Claudia Morrell, held a meeting for the team on May 10-11, 2011 at the Heart of Georgia Technical College in Dublin, GA. The training session focused on reviewing the Five-Step Program Improvement Process, survey design, and creating marketing and recruitment materials for the state. Ten pilot site participants attended the session.

At the end of the meeting, participants were asked to evaluate the session by competing a brief, anonymous survey. The survey included 9 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A. Out of the 10 people that attended the session, 8 completed the survey.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about the session's content, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed that the training reflected careful planning and organization (average rating 3.9). They also strongly agreed that the meeting's content will be useful in the work they do related to gender equity and with their students (average rating 3.9, each).

II. Content Learning from Session

The next set of questions asked about what the participants learned about current Pipeline work and what they were able to take away from the meeting. Again, responses were mostly positive. Participants agreed that they are now more familiar with the Five-Step Improvement Process (average rating 3.4). In addition, participants felt that the discussions at the workshop were very useful. Participants strongly agreed that the discussion of their colleges' plans has helped them to better understand options for identifying and addressing the needs of students pursuing nontraditional careers (average rating 3.6). They found that the discussion of assessment and surveys helped them better understand the process and available tools for survey and data collection (average rating 3.8). Similarly, participants strongly agreed that the discussion of marketing, social media, and brochure development gave them ideas for developing resources that they can

use, including webinars (average rating 3.8). Participants also found the webinar on marketing useful (average rating 3.6).

In regards to their future work, participants strongly agreed that because of the workshop, they would be likely to go to the NAPE and STEM Equity Pipeline websites to find other resources (average rating 3.8). They also strongly agreed that the materials and tools presented would be useful to them in their work and that the session gave them ideas of what they can do to enhance their work in programs and services for females in nontraditional programs (average rating 3.9, each). Lastly, participants believed that the addition of students from nontraditional programs added new insights and energy to the discussion (average rating 3.6).

III. Open-ended questions/comments

Participants were also asked if they had any additional comments. Four participants offered praise for the excellent session. Selected responses are below:

- Claudia did a great job. She knows how to make workshops useful, successful, and informative. She is motivated and gets and keeps things going.
- Excellent presentation - Claudia was personable, informative, and patient. I will contact her for additional assistance with my survey!

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed highly favorably by the participants and was useful in several respects. Participants felt the session was organized and useful overall. It gave participants a better understanding of the Five-Step Improvement Process and provided resources and ideas for their future work around STEM equity.

Iowa Community Colleges:
Expanding Options for Nontraditional Students
STEM Equity Pipeline Project
July 6, 2010 Survey Results

INTRODUCTION

The state facilitator for Iowa, Courtney Reed-Jenkins, held a meeting for community colleges on using the 5-step process on July 6th, 2010 at Iowa Lakes Community College Emmetsburg, IA. Three community colleges were represented at the meeting. The purpose of the workshop was to cover steps 1-4 of the Five-Step Improvement Process. The focus of the meeting was for each college to identify programs to focus on during the school year, and to identify root causes and begin to select strategies to address those causes. Out of the 10 people that attended the session, 5 completed the survey.

At the end of the meeting, participants were asked to evaluate the session by competing a brief, anonymous survey. The survey included 8 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about content learning from the session, and the third section provides the responses to the open-ended question. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed that the training reflected careful planning and organization (average rating 3.8). They also strongly agreed that the content of the meeting will be useful to the work they do related to gender equity (average rating 3.8).

II. Content Learning from Session

The next set of questions asked about what the participants learned about current Pipeline work and what they were able to take away from the meeting. Again, responses were generally very positive. Participants agreed that they will be able to use the data presented (or similar data) to identify gaps in performance between different groups of students, and that they have an idea of what data sources they can use to identify those gaps (average rating 3.4, each). They also agreed that they now understand benchmarking and know what sources of benchmarking they can use (average rating 3.1). Further, participants felt that as a result of this session, they now have an increased understanding of the root causes identified in research on participation and completion of women and girls in STEM (average rating 3.6).

When asked about their own research and evaluation, participants agreed that they will be able to use the resources and tools identified in the session to conduct their own action research to identify potential root causes (average rating 3.6). They also agreed that they now know how to analyze and evaluate potential causes to identify the most direct root cause (average rating 3.4). Lastly, as a result of the session, participants agreed that they have a better understanding of what to consider for evaluating solutions, how to match solutions to the identified root causes, and how to identify resources for researching potential solutions that can be implemented (average ratings 3.4, 3.4, and 3.6, respectively).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they will do next as a follow-up to this meeting. Only two participants listed comments, listed below:

- Implement ideas
- Conduct campus meeting to share materials/resources with others.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was well organized and useful overall. It gave participants a better understanding of how to identify appropriate resources and data, and to evaluate potential root causes and solutions. It also provided an opportunity to learn about the available resources.

Iowa Community Colleges:
Expanding Options for Nontraditional Students
STEM Equity Pipeline Project
August 5, 2010 Survey Results

INTRODUCTION

The state facilitator for Iowa, Courtney Reed Jenkins, held a meeting for community colleges on the 5-step process on August 5th, 2010 at the Des Moines Area Community College in Iowa Lakes Community College in Ankeny, IA. Seven community colleges were represented at the meeting. The purpose of the workshop was to cover steps 1-4 of the Five-Step Improvement Process. Thirty-six community college faculty, administrators, and staff attended the session.

At the end of the meeting, participants were asked to evaluate the session by competing a brief, anonymous survey. The survey included 11 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A. Out of the 36 people that attended the session, 20 completed the survey.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about content learning from the session, and the third section provides the responses to the open-ended question. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. All respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.4). They also agreed that the content of the meeting will be useful to the work they do related to gender equity (average rating 3.3).

II. Content Learning from Session

The next set of questions asked about what the participants learned about current Pipeline work and what they were able to take away from the meeting. Again, responses were generally very positive. Participants agreed that they will be able to use the data presented (or similar data) to identify gaps in performance between different groups of students, and that they have an idea of what data sources they can use to identify those gaps (average ratings 3.2 and 3.3, respectively). They also agreed that they now understand benchmarking and know what sources of benchmarking they can use (average rating 3.2). Further, participants felt that as a result of this session, they now have an increased understanding of the root causes identified in research on participation and completion of women and girls in STEM (average rating 3.4).

When asked about their own research and evaluation, participants agreed that they will be able to use the resources and tools identified in the session to conduct their own action research to identify potential root causes (average rating 3.4). They also agreed that they now know how to analyze and evaluate potential causes to identify the most direct root cause (average rating 3.3). Lastly, as a result of the session, participants agreed that they have a better understanding of what to consider for evaluating solutions, how to match solutions to the identified root causes, and how to identify resources for researching potential solutions that can be implemented (average ratings 3.3, 3.2, and 3.3, respectively).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they will do next as a follow-up to this meeting. Eight participants provided responses. Most respondents said that they would share the information they learned in the session with others and plan next steps. Selected responses are listed below:

- Meet with key stakeholders to determine next course of action.
- Recruit more team members and partners. Share information learned. Meet with grant writer to utilize information for future grant ideas/programs. Utilize information for my IT program initiative.
- Write my grant. Plan a signature event to address leaks in the pipeline.
- Discuss with students, faculty and high schools possible implementation strategies.

Participants were also asked to share any additional comments. Three participants responded. Their comments are listed below:

- The 5-Step process is basic and could have been explained in 1 hour. A better use of time would be a workshop on how to design and implement, and measure specific strategies and practices.
- Great workshop, very informative and productive use of time. Thanks!
- Nicely done! Thanks!

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was well organized and useful overall. It gave participants a better understanding of how to identify appropriate resources and data, and to evaluate potential root causes and solutions. It also provided an opportunity to learn about the available resources.

Counselors are Key:
Expanding Options for Nontraditional Students
March 25, 2011 Survey Results

INTRODUCTION

A STEM Equity Pipeline workshop was conducted by Courtney Reed Jenkins on March 25, 2011 at Eastern Iowa Community College, Davenport, IA. The purpose of the workshop was to train K-12 Counselors and EICCD Full time Advisors to work with underrepresented populations. Out of the 18 people that attended the session, 17 completed the evaluation survey.

At the end of the meeting, participants were asked to evaluate the session by competing a brief, anonymous survey. The survey included 8 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about content learning from the session, and the third section provides the responses to the open-ended question. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed that the training reflected careful planning and organization (average rating 3.6). They also agreed that the content of the meeting will be useful to the work they do related to gender equity (average rating 3.4).

II. Content Learning from Session

The next set of questions asked about what the participants learned about STEM equity and the Pipeline project, as well as what they were able to take away from the meeting. Again, responses were mostly positive. Participants agreed that they understand the trends of female students in STEM classes, including career and technical education and post-secondary (average rating 3.4). They also agreed that they can identify "bridge" or "transition" points for females in STEM classes and careers, and that they learned the differences between female and male students in nontraditional careers (average rating 3.3, each).

In addition, participants agreed that as a result of this session, they have an increased understanding of the root causes identified in research on participation and completion of females in STEM (average rating 3.4). They also understand how to match solutions to root causes that have been identified (average rating 3.1). Lastly, participants agreed that

they can now identify resources for researching potential solutions that can be implemented (average rating 3.1).

III. Open-ended questions/comments

At the end of the survey, participants were asked to provide a brief description of something they will do as a follow-up to the training. Six of the participants responded. The responses are listed below:

- Explore more opportunities (websites) for girls to use when doing the career exploration unit.
- Actively engage and encourage male and female students to explore opportunities in the nontraditional career arena.
- Discuss with other counselors about the risk of biased counseling. Reassess techniques I am using to be sure of being unbiased.
- I will use resources provided during this meeting to expand and identify bridge and transition points to expand career options for nontraditional students.
- Develop a girl focused STEM career event.
- Provide staff development on topic for other topics.

Other additional comments included "thank you," and "well done." One participant commented, "would have liked to have resources included in packet. Really appreciated the 'roots, causes and strategies' research handout pack."

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was organized and useful overall. It gave participants a better understanding of issues related to gender equity in STEM and of resources available for work around gender equity.

STEM Equity Pipeline Project
Five-Step Program Improvement Process Training
New Hampshire Pilot Sites
September 21, 2010 Survey Results

INTRODUCTION

The state facilitator for New Hampshire, Mimi Lufkin, held a meeting for pilot site participants on September 21, 2010 at Granite State College in Concord, NH. The training session focused on providing training on the Five-Step Program Improvement Process. The purpose of the training was to train in Steps 1 and 2 of the Five Step Program Improvement Process. 17 state members attended the session and 16 completed the evaluation survey.

The survey included 9 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A. Out of the 17 people that attended the session, 16 completed the survey.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.5). They also generally agreed that the materials provided were useful for learning what they need to know and do (average rating 3.4).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about the Five-Step Process. Again, responses were mostly positive. Participants agreed that they understand the components of the Five-Step Process and will be able to implement steps one and two at their pilot sites (average rating 2.9). They also agreed that in general they understand the process of Documenting Performance Results, of CTE accountability, and of how to look at trends and patterns in their districts' data (average ratings 2.8, 2.8, and 3.0, respectively).

When asked if they felt they had an improved understanding of root causes and how to address them in their work, most participants agreed (average rating 3.0). The participants also agreed that the exercises that were included in the discussion of root causes helped them understand it (average rating 3.3). Finally, the participants felt they

got ideas about how they can use what they learned in the training in their work with their pilot sites (average rating 3.1).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. All but one participant provided a response. Most respondents mentioned creating and conducting a survey. They also mentioned sharing the information with their schools. Selected responses are listed below:

- I want to look at 5 step change process and its adaptability to implementation of new initiative planning.
- Take a look at individual sites to identify areas to focus on.
- The survey results will be indicative of my specific response at the high school level. I do know I will be happy to facilitate our response across the school.
- We will develop surveys to determine root causes.
- Create surveys - provide leadership and support for the team.

Participants were also asked what they still have questions or are unsure about. A few participants listed items which are listed below:

- Documenting performance results
- New terms, I want to be proficient in using
- Final goal
- The depth of data - I need to explore further to fully understand data and its implications.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was organized and that the materials would be useful. It gave participants a better understanding of the Five-Step Process, accountability data, and root causes. In addition, participants left the session with ideas of what to do next at their pilot sites and helped them understand the need to conduct surveys at their sites.

STEM Equity Pipeline Project
Resources for Professional Development for STEM Educators
Granite State College, Concord, NH
September 22, 2010 Survey Results

INTRODUCTION

The state facilitator for New Hampshire, Mimi Lufkin, held a meeting for pilot site participants on September 22, 2010 at Granite State College in Concord, NH. The training session focused on providing professional development for STEM educators. During the session, participants learned about the STEM Equity Project, the Five-Step Process, and about resources available around STEM equity issues. 16 state members attended the session and 13 completed the evaluation survey.

The survey included 10 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed that the training reflected careful planning and organization (average rating 3.8). They also strongly agreed that the materials provided were useful for learning what they need to know and do (average rating 3.8).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about STEM equity and the Pipeline project, as well as what they were able to take away from the meeting. Again, responses were mostly positive. Participants strongly agreed that they understand the purpose and goals of the STEM Equity Project (average rating 3.8). They also agreed that they now have a basic understanding of the Five-Step Process, and that the research literature review on root causes will be useful to them in their work on gender equity (average ratings 3.2 and 3.4, respectively). Further, participants felt that it was useful to learn about resources from others and agreed that they will use the resources of the Virtual Learning Community (average rating 3.2, each).

In addition, participants felt that they have increased their understanding of the importance and relevance of gender equity work (average rating 3.5). They have developed new ideas about how they will be able to promote and disseminate information

and resources about STEM equity in the state (average rating 3.5). Further, they agreed that they have ideas about how they can use what they learned in the training as they work with their pilot sites (average rating 3.4).

III. Open-ended questions/comments

At the end of the survey, participants were asked to share any additional comments. Ten of the participants wrote comments which were very positive. The participants said they enjoyed the presentation and the resources. Selected comments are listed below:

- Thank you for providing so many resources, ideas and practical activities. I enjoyed this thoroughly!
- I would love to see a workshop where people in NH could come together to share what they are doing specifically and successfully to increase nontraditional participants to STEM programs and how they are getting teacher involvement.
- The second day helped solidify ideas I had learned from the first day. Have lots of ideas to share with non-traditional coordinators, etc.
- Thank you for the ample targeted resources (plus educational comments!). Emphasis on data review and use very helpful 5-Step Process.
- I wasn't aware of the work that has been completed in gender equity issues - nice job!

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was organized and useful overall. It gave participants a better understanding of the project and the Five-Step Process, as well as introduced them to the resources they can use in their pilot projects. In addition, participants left the session with ideas of how to improve STEM equity in their own sites and on how to disseminate what they learned.

STEM Equity Pipeline Project
Five-Step Program Improvement Process Training (Steps 3-5)
New Hampshire Pilot Series
February 23, 2011 Survey Results

INTRODUCTION

The state facilitator for New Hampshire, Mimi Lufkin, held a meeting for pilot site participants on February 23, 2011at Plymouth Graduate Center in Concord, NH. The purpose of the session was to train participants on steps 3-5 of the Five-Step Program Improvement Process. 13 state members attended the session and 11 completed the evaluation survey.

At the end of the meeting, participants were asked to evaluate the session by competing a brief, anonymous survey. The survey included 9 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. All respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.6). They also strongly agreed that the materials provided were useful for learning what they need to know and do (average rating 3.6).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about Five-Step Process. Again, responses were very positive. Participants agreed that at this session they learned about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.5 and 3.4, respectively). They strongly agreed that as a result of this session they know where there are lots of web-based resources to help them identify and plan an implementation strategy based on their identified root cause(s) (average rating 3.8).

In terms of working at their pilot sites, participants agreed that they now know how to write a SMART objective (average rating 3.5). They also now know the difference between a summative and formative evaluation and the importance of both (average

rating 3.4). Lastly, participants agreed that they learned about new tools to help them with project management that will help them implement their selected strategies and that they have ideas about how they can use what they learned at the training in their work at the pilot sites (average ratings 3.4 and 3.5, respectively).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. Eight of the participants provided responses. Respondents mentioned sharing what they learned and working on surveys. Selected responses are listed below:

- Continue survey of middle and high school - continue working with elementary school on strategy for teachers.
- Incorporate information and strategies into grant-writing and project development efforts.
- Will share with my colleagues and identify how we might accommodate STEM education.
- Discuss the strategy my team created with the rest of committee - possibly implement.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was well organized and that the materials would be useful. It gave participants a better understanding of the Five-Step Process and of evaluation. In addition, participants left the session with ideas of what to do next at their pilot sites.

STEM Equity Pipeline Project
Five-Step Program Improvement Process Training
Ohio Pilot Sites
October 15, 2010 Survey Results

INTRODUCTION

The state facilitator for Ohio, Katherine Weber, held a meeting for pilot site participants on October 15, 2010 at Washington State Community College, in Marietta, OH. The session focused on steps one and two of the Five-Step Program Improvement Process. During the training, the team decided on a possible root cause and created an action plan to investigate the potential cause. Eleven state members attended the session and 10 completed the evaluation survey.

The survey included 9 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. All respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.8). They also strongly agreed that the materials provided were useful for learning what they need to know and do (average rating 3.7).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about the Five-Step Process. Again, responses were mostly positive. Participants strongly agreed that they understand the components of the Five-Step Process and will be able to implement steps one and two at their pilot sites (average rating 3.6). They also agreed that in general they understand the process of Documenting Performance Results, of CTE accountability, and of how to look at trends and patterns in their districts' data (average ratings 3.4, 3.6, and 3.6, respectively).

When asked if they felt they had an improved understanding of root causes and how to address them in their work, most participants strongly agreed (average rating 3.7). The participants also strongly agreed that the exercises that were included in the discussion of root causes helped them understand it (average rating 3.8). Finally, the participants felt

they got ideas about how they can use what they learned in the training in their work with their pilot sites (average rating 3.3).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. All of the participants provided a response. The responses were varied and are all listed below:

- Meet to learn steps 3-5.
- Collect names of my non-traditional students to participate.
- Become more aware of how I deal with students, how they deal with each other, classroom, environment, etc.
- Help with research.
- Provide feedback, communication awareness of gender - STEM issues.
- Will talk up the pilot site implementation at the state level.
- Focus group/surveys.
- Complete bench marking of a program vs. 4 other institutions.
- Review causes of data discrepancies.
- I plan to use this information in future meetings.

Participants were also asked what they still have questions or are unsure about. Only one participant responded, saying he/she is unsure about "using technology to mine data." Lastly, several participants commented that they felt it was an excellent training.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed very favorably by the participants and was useful in several respects. Participants felt the session was well organized and that the materials would be useful. It gave participants a better understanding of the first two steps in the Five-Step Process, accountability data, and root causes. In addition, participants left the session with ideas of what to do next at their pilot sites.

STEM Equity Pipeline Project
Five-Step Program Improvement Process Training
Ohio Pilot Sites
October 25, 2010 Survey Results

INTRODUCTION

The state facilitator for Ohio, Katherine Weber, held a meeting for the team on October 25, 2010 at Cincinnati Nature Center in Cincinnati, OH. The training session focused on providing training on the Five-Step Program Improvement Process. The purpose of the training was to provide the Five Step Program Improvement Process training on Steps 1 and 2. 23 state members attended the session and 16 completed the evaluation survey.

The survey included 9 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A. This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.4). They also generally strongly agreed that the materials provided were useful for learning what they need to know and do (average rating 3.5).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about the Five-Step Process. Again, responses were mostly positive. Participants agreed that they understand the components of the Five-Step Process and will be able to implement steps one and two at their pilot sites (average rating 3.1). They also agreed that in general they understand the process of Documenting Performance Results, of CTE accountability, and of how to look at trends and patterns in their districts' data (average rating 2.8, 3.1, and 3.3, respectively).

When asked if they felt they had an improved understanding of root causes and how to address them in their work, most participants strongly agreed or agreed (average rating 3.1). The participants also agreed that the exercises that were included in the discussion of root causes helped them understand it (average rating 3.1). Finally, the participants felt they got ideas about how they can use what they learned in the training in their work with their pilot sites (average rating 3.1).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. Six of the participants provided responses which are listed below:

- I will meet with our team, discuss our roles, consider how root causes impact our progress.
- CIP codes and data.
- Identify the CIP for my Career technical area and "root cause survey" with my students.
- Get data, develop a plan, do it!
- STEM Equity Marketing in the school.
- We need to figure out what data to choose.

Participants were also asked what they still have questions or are unsure about. A few participants listed items which are listed below:

- Perkins measures
- I did not understand what my purpose was on this project until I talked with Ben at lunch time.
- How the action research will work

Lastly, participants were asked to share any additional comments about the training. Several respondents mentioned that they enjoyed the training. One respondent felt it would have been useful to better understand the data they were looking at.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was organized and that the materials would be useful. It gave participants a better understanding of the Five-Step Process, accountability data, and root causes. In addition, participants left the session with ideas of what to do next at their pilot sites.

STEM Equity Pipeline Project
Five-Step Program Improvement Process Training Phase II (Steps 3-5)
Ohio Pilot Sites
February 28, 2011 Survey Results

INTRODUCTION

The state facilitator for Ohio, Katherine Weber, held a meeting for the pilot site participants on February 28, 2011 in Cincinnati, OH. The session focused on providing training on steps three through five of the Five-Step Program Improvement Process. 10 state members attended the session and 8 completed an evaluation survey. The survey included 9 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.6). They also generally strongly agreed that the materials provided were useful for learning what they need to know and do (average rating 3.8).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about the Five-Step Process. Again, responses were mostly positive. Participants strongly agreed that at this session they learned about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.8 and 3.5, respectively). They also strongly agreed that as a result of this session they know where there are lots of web-based resources to help them identify and plan an implementation strategy based on their identified root cause(s) (average rating 3.9).

In terms of working with their pilot sites, participants strongly agreed that they now know how to write a SMART objective (average rating 3.5). They also now know the difference between a summative and formative evaluation and the importance of both (average rating 3.8). Lastly, participants strongly agreed that they learned about new tools to help them with project management that will help them implement their selected strategies and that they have ideas about how they can use what they learned at the training in their work at the pilot sites (average rating 3.6, each)

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. Five of the participants provided responses which are listed below:

- Finish documentation to validate root cause.
- More time needed on the strategies and good writing.
- The resources are invaluable. I will put to immediate use.
- Use it as a real working session and providing feedback.
- Identify a single root cause using the WE ARE IT and build my strategy and create my plan.

Participants were also asked what they still have questions or are unsure about. A few participants listed items which are listed below:

- Evaluation tools that lead to true measure of outcome.
- About objectives and choosing strategies as well as validating root causes.
- I'm a little unsure about the process but I know I can get help when I put it together.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed very favorably by the participants and was useful in several respects. Participants felt the session was well organized and that the materials would be useful. It gave participants a better understanding of the Five-Step Process and of evaluation. In addition, participants left the session with ideas of what to do next at their pilot sites.

STEM Equity Pipeline Project
Five-Step Program Improvement Process Training Phase II (Steps 3-5)
Ohio Pilot Series
April 8th, 2011 Survey Results

INTRODUCTION

The state facilitator for Ohio, Katherine Weber, held a meeting for pilot site participants on April 8th, 2011 at Sinclair Community College in Dayton, OH. The purpose of the session was to train participants on steps 3-5 of the Five-Step Program Improvement Process. 8 state members attended the session and 6 completed an evaluation survey.

The survey included 9 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A. This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. All respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.6). They also agreed that the materials provided were useful for learning what they need to know and do (average rating 3.3).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about the Five-Step Process. Again, responses were very positive. Overall, participants strongly agreed that at this session they learned about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.5 and 3.7, respectively). They also strongly agreed that as a result of this session they know where there are lots of web-based resources to help them identify and plan an implementation strategy based on their identified root cause(s) (average rating 3.7).

In terms of working at their pilot sites, participants strongly agreed that they now know how to write a SMART objective (average rating 3.6). They also now know the difference between a summative and formative evaluation and the importance of both (average rating 3.5). Lastly, participants agreed that they learned about new tools to help them with project management that will help them implement their selected strategies, and that they have ideas about how they can use what they learned at the training in their work at the pilot sites (average rating 3.2 and 3.3, respectively).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. Four of the participants provided responses which are listed below:

- As a team continue to work through the root cause/SWOT exercise.
- Develop mentor, sites/people in non-traditional roles.
- Work on our identified strategy to collaborate w/partners to gather data around non-traditional recruitment and hiring practices and opportunities.
- Sustain engagement with the project.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was well organized and that the materials would be useful. It gave participants a better understanding of the Five-Step Process and of evaluation. In addition, participants left the session with ideas of what to do next at their pilot sites.

STEM Equity Pipeline Project
Five-Step Program Improvement Process Training Phase II (Steps 3-5)
Washington State Community College
May 6, 2011 Survey Results

INTRODUCTION

The state facilitator for Ohio, Katherine Weber, held a meeting for pilot site participants on May 6, 2011 at Washington State Community College in Marietta, OH. The purpose of the session was to train participants on steps 3-5 of the Five-Step Program Improvement Process. The facilitator used focus group data collected from the pilot site to demonstrate the steps. Six state members attended the session and 5 completed an evaluation survey.

The survey included 9 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A. This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. All respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.6). They also agreed that the materials provided were useful for learning what they need to know and do (average rating 3.4).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about the Five-Step Process. Again, responses were very positive. Participants agreed that at this session they learned about research-based strategies for increasing the participation of females in STEM, and that they now have a better understanding of the connection between root causes and strategies for increasing females' participation and completion of STEM programs of study (average ratings 3.2 and 3.4, respectively). They strongly agreed that as a result of this session they know where there are lots of web-based resources to help them identify and plan an implementation strategy based on their identified root cause(s) (average rating 3.6).

In terms of working at their pilot sites, participants agreed that they now know how to write a SMART objective (average rating 3.0). They also now know the difference between a summative and formative evaluation and the importance of both (average rating 3.2). Lastly, participants agreed that they learned about new tools to help them with project management that will help them implement their selected strategies and that

they have ideas about how they can use what they learned at the training in their work at the pilot sites (average ratings 3.2 and 3.6, respectively).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. Three of the participants provided responses which are listed below:

- Involve STEM in current projects
- Investigate possibility of female engineering cohort
- Write a SMART objective for what I want to accomplish

Participants were also asked what they still have questions or are unsure about. Only one participant responded to this item, saying, “More information about grant opportunities related to STEM Equity.”

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was well organized and that the materials would be useful. It gave participants a better understanding of the Five-Step Process and of evaluation. In addition, participants left the session with ideas of what to do next at their pilot sites.

STEM Equity Pipeline Project
Texas Pilot Site Meeting
October 5-6, 2010 Survey Results

INTRODUCTION

The state facilitator for Texas, Susie Wheeler, held a meeting for the pilot site participants on October 5th and 6th, 2010 at the TACTE Conference in Austin, TX. The session was the first meeting of the four community colleges selected for the Texas Stem Equity Pipeline project. The purpose of the meeting was to review of Five-Step Process and to set deadlines for each phase. Eight state members attended the session and 5 completed an evaluation survey.

The survey included 8 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A. This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about knowledge development and the participants' next steps, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. All respondents strongly agreed that the training reflected careful planning and organization (average rating 4.0). They also strongly agreed that the materials provided were useful for learning what they need to know and do (average rating 4.0).

II. Knowledge Development and Next Steps

The next set of questions asked about what the participants learned about the Five-Step Process. Again, responses were mostly positive. All of the respondents strongly agreed that the session improved their knowledge of the Five-Step Process. Participants also strongly agreed that they understand what the expectations are for the pilot sites and what they will need to do to evaluate the work (average rating 3.8). They all believed that they will be able to design an evaluation of the work (average rating 3.6).

In regards to their future work, participants strongly agreed that they know how to participate and will use the resources of the Virtual Learning Community (average rating 3.8). They felt that the session helped them to develop a plan for moving ahead with work in the pilot sites, and that they have ideas about how they can use what they learned at the training (average rating 3.8, each).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they know they will do next as part of their involvement with their pilot sites. Three of the participants provided a response, all of which are listed below:

- Research various data sources
- Next, we will focus on a plan for figuring out the root causes. We will have a team meeting and come up with focus groups, surveys, etc.
- I will share the NAPE 5-Step Process

Participants were also asked what they still have questions or are unsure about. A few participants mentioned that they needed to digest the information before responding. One participant mentioned being unsure about "how to get meetings that all my members can attend."

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was organized and that the materials would be useful. It gave participants a better understanding of the Five-Step Process and of what to do next at their pilot sites.

Wisconsin STEM Equity Pipeline Project Planning Meeting
August 12, 2010 Survey Results

INTRODUCTION

Wisconsin project participants gathered for a meeting on August 12, 2012 at Lakeshore Technical College in Cleveland, WI. The session focused on coordinating and planning future activities. 10 state members attended the session and 8 completed an evaluation survey. The survey included 10 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about their progress and planning, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.6). They all strongly agreed that the content of the meeting will be useful to them in the work they do related to promoting gender equity (average rating 4.0).

II. Progress and Planning

The next set of questions asked about the plans the participants were able to make during the session. The participants agreed that the discussion of the calendar was efficient and productive, and that it resulted in a clear set of dates for events (average ratings 3.1 and 3.4, respectively). They also were able to set priorities based on interests and were able to determine several interests that they could pursue collaboratively (average ratings 3.5 and 3.6, respectively).

In addition, participants felt that they were able to identify lead coordinators and set dates for the next events as well as create action plans for all activities (average ratings 3.5 and 3.1, respectively). When asked if they felt they did not have time to create action plans for all activities and if they did not identify a fall date for the next conference call, most participants disagreed (average ratings 2.0 and 1.8, respectively).

III. Open-ended questions/comments

At the end of the survey, participants were asked to share any additional comments. Three participants wrote in comments which are listed below:

- Very productive. Appreciated the input from the Girls Scouts and 4-H representatives - very helpful!
- Excellent meeting - good work - lots of great ideas and activities to pursue.
- Difficult to understand question and how to answer

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed very favorably by the participants and was useful in several respects. Participants felt the session was well organized and that the content would be useful. Participants were able to set dates for future events, prioritize their interests, and create action plans for activities.

STEM Equity Pipeline Project Leadership Institute
April 10, 2011 Survey Results

Introduction

As part of the STEM Equity Pipeline Project, state team leaders met at a Leadership Institute. The meeting was facilitated by Mimi Lufkin and members of the STEM Equity Pipeline Team on April 10, 2011 at the Doubletree Hotel in Crystal City, VA. This event brought together team leaders from different states and allowed them to learn from each other. The training session included presentations by team leaders who shared successes and challenges as well as set expectations for the project. Attendees participated in small and large group discussions in addition to the presentations 79 leaders attended the session and 59 completed an evaluation survey. The survey included 10 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The average ratings for each corresponding question are provided in Appendix A.

This report is organized into five sections. The first briefly describes the background of the survey participants. The second section summarizes the participants' opinions towards the session's format; the third section summarizes their responses to questions about their understanding of the STEM Equity Pipeline Project, and the fourth section summarizes their responses to questions about the future of the project. The final section is a conclusion that provides a summary of the findings.

I. Participant Background

At the beginning of the survey, participants were asked to indicate which state they are from and to list their position or role. Of the 59 participants, 57 indicated their state. The states with the most representatives were GA (n = 11), OH (n = 7), NH (n = 6), CA (n = 5), IA (n = 5), MN (n = 5), and WI (n = 5). The other represented states were IL (n = 4), MO (n = 3), TX (n = 3), ID (n = 2), and CO (n = 1). A variety of positions and roles were listed by the participants. The most frequently listed included positions like Special Population Coordinator, CTE Coordinator, Perkins Coordinator, and involvement in vocational education and career counseling.

II. Format

Participants responded very favorably to the format of the institute. The majority strongly agreed that the training reflected careful planning and organization (average rating 3.7), and that the institute's content will be useful in the work they do related to gender equity (average rating 3.6). None of the respondents disagreed with these statements.

III. Understanding of the STEM Equity Pipeline Project

The next set of questions asked about what participants' gained, particularly by learning about what other states are doing in the STEM Equity Pipeline Project. All respondents strongly agreed or agreed that they learned implementation strategies from other states

(average rating 3.6). Respondents also agreed that learning about other states' experiences with the project gave them ideas for addressing challenges in their own states (average rating 3.5). In addition, participants felt that they benefited from networking with other states during the institute (average rating 3.6). Most participants agreed that they now know more about the role of participating states in the collection of data for the project evaluation (average rating 3.1). Lastly, the participants generally agreed that they developed a better understanding of how the national context and social climate impact gender equity work (average rating 3.3).

IV. Next Steps

The last set of questions asked about how the participants would use their knowledge gained at the institute and their thoughts on a STEM Equity Pipeline Project blog. Again, responses were very positive. The majority of respondents strongly agreed that they learned about at least one new opportunity (informational resources, strategies, potential partners, etc.) that they will pursue when they return to their states (average rating 3.6) Participants also agreed that they got ideas about what they can do to support their projects from the information provided (average rating 3.5). Lastly, participants were asked if they would read a STEM Equity Pipeline blog if one was made available on the project website, and if so, to state which topics they would like to see covered. Most participants agreed that they would read the blog (average rating 3.2). A list of the blog topics suggested by the respondents is listed below:

- Involving stakeholders statewide. How to find institutions
- Common core and what STEM looks like with it
- Innovative strategies for STEM participation and STEM program retention
- Collaboration of education, business and industry, rural pops versus urban pops, socioeconomic challenges - what to do??
- Data, benchmarking, performance targets and best practices
- Networking partnerships
- Update of projects, marketing ideas
- Projects to recruit and retain students
- Teacher PD, Curriculum support, CBO support, suggestions and materials available. Support for elementary grades.
- Tool kits; step by step
- Research, pilot projects, best practices
- CTE, Opportunities for Girls in STEM, Nontraditional career opportunities for males and females, community partner sites in STEM, educational and corporate partnerships in STEM, Tools for guidance counselors regarding STEM recruitment for girls
- Business/Industries who are or want to work on gender equity incentives
- Tech integration, toolkit contents and types, green/alternate energy topics
- Real-life applications or success stories at the community college level
- How to get state government buy in
- How to create related resources to STEM
- Shared best practices, funding opportunities

- Data collection, etc., multicultural curriculum
- Sample event descriptions/FAQ and answers, useful resources and websites

V. Conclusion

Based on the survey responses from the institute participants, the meeting was viewed very favorably and was useful in several respects. The respondents felt the meeting was well organized and provided practical information. The meeting gave participants a better understanding of what other states were doing around STEM equity. It also provided an opportunity to learn about new strategies and resources which they can now adopt in their states.

Kansas Career and Technical Education:
Expanding Options for Nontraditional Students
September 20-21, 2010 Survey Results

INTRODUCTION

Although Kansas is not a STEM Equity state, a meeting was held for individuals interested in STEM Equity in Wichita, KS, on September 20-21, 2010 at the Greenbush Center for Staff Development in Wichita, KS. The training session focused on nontraditional participation and completion focusing on stereotypes/changing unconscious bias and ways to increase awareness of NTO's. The session had 75 participants and 49 completed the evaluation survey. The survey included 11 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about the session's content, and the third section provides the responses to the open-ended questions. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed or agreed that the training reflected careful planning and organization (average rating 3.3). They also generally agreed that the meeting's content will be useful in the work they do related to gender equity (average rating 3.1).

II. Content Learning from Session

The next set of questions asked about what the participants learned about current Pipeline work and what they were able to take away from the meeting. Again, responses were mostly positive. Participants agreed that they will be able to use the data presented (or similar data) to identify gaps in performance between different groups of students, and that they have an idea of what data sources they can use to identify those gaps (average ratings 2.9 and 3.0, respectively). They also agreed that they now understand benchmarking and know what sources of benchmarking they can use (average rating 2.5). Further, participants felt that as a result of this session, they now have an increased understanding of the root causes identified in research on participation and completion of women and girls in STEM (average rating 3.2).

When asked about their own research and evaluation, participants agreed that they will be able to use the resources and tools identified in the session to conduct their own action research to identify potential root causes (average rating 3.1). They also agreed that they

now know how to analyze and evaluate potential causes to identify the most direct root cause (average rating 3.0). Lastly, as a result of the session, participants agreed that they have a better understanding of what to consider for evaluating solutions, how to match solutions to the identified root causes, and how to identify resources for researching potential solutions that can be implemented (average ratings 3.0, 2.9, and 3.2, respectively).

III. Open-ended questions/comments

At the end of the survey, participants were asked to write a brief description of something they would do next as a follow-up to the meeting. Of the 49 participants, 24 provided responses to this item. The most frequently mentioned actions included sharing what they learned at the session with other CTE staff, further examining their own data and programs, and taking steps to increase recruitment for women and girls in STEM as well as work on retention. Selected responses are listed below:

- Try to keep girls in our CTE programs while also trying to make sure they get all the academics difficult to balance.
- I plan to share the presentation and the materials with my counselors and CTE instructors. We will have discussions (and hopefully implementation sessions) in regards to improving our gender bias problems.
- Taking general recruitment activities to next level by adding in targeted activities for nontraditional students.
- Share information with CTE coordinator and begin researching our school data.
- I will go back to my school and inform the CTE staff of what I learned. Root causes in our programs for the lack of non-traditional part will be discussed along with how we will implement strategies.
- I will use the "could this be my life" website for my JH girls. I will share the websites with my CTE teachers.
- Create videos to promote CTE programs including non-traditional students as role models.
- I plan to implement a career fair and focus on more non-traditional speakers.

Participants were also asked if they had any additional comments. Participants offered praise for the excellent session. They also mentioned several issues they had during the session and made suggestions for improvement. Selected responses are below:

- In small districts we can have classes with a natural imbalance of gender - we have a 5th grade (whole grade) with 26 boys and only 6 girls. When that group is old enough to go to high school it could create big problems. The same could happen in reverse. Most small districts would greatly benefit from an every years numbers evaluation, some years will be up some down.
- The conference should have been scheduled for one full day instead of two half-days. It was very inconvenient to miss work for two days for a six hour conference. I also recommend notifying us about bringing our data so we could analyze our data during the conference.

- It was very difficult to participate when we didn't have the handouts. Our entire table didn't have 2 of the handouts; one of which was needed for a lengthy afternoon activity. Guest speaker was going to find handouts for us, but never did.
- I anticipated learning from the speaker strategies and helps to increase non-traditional enrollment. Our workshop was more of a networking with fellow districts rather than getting concrete information from speaker.
- If we were supposed to access our school district's data on the KSDE website it would have been nice to have known this when we enrolled in this workshop so that we could have brought the access info (password and name).
- Good job keeping it up!

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was organized and useful overall. It gave participants a better understanding of how to identify appropriate resources and data, and evaluate potential root causes and solutions. It also provided an opportunity to learn about the available resources. In addition, participants left the session with ideas of how to improve STEM equity in their own schools.

National Career Pathways Network Conference
STEM Equity Pipeline Workshop
October 22, 2010 Survey Results

INTRODUCTION

A STEM Equity Pipeline Workshop was conducted at the Nation Career Pathways Network Conference on October 22, 2010 at the Sheraton Dallas Conference Center, Dallas, TX. The purpose of the workshop was to provide an overview of the Five Step Program Improvement Process. The participants included teachers, administrators, counselors and school staff. 12 participants attended the session and 10 completed the evaluation survey. The survey included 8 statements around the meeting's format and content. Participants rated each statement on a scale of "1"—Strongly Disagree to "4" Strongly Agree. The statistics for each corresponding question are provided in Appendix A.

This report is organized into four sections. The first summarizes the participants' opinions towards the session's format; the second section summarizes their responses to questions about content learning from the session, and the third section provides the responses to the open-ended question. The final section is a conclusion that provides a summary of the findings.

I. Format

Participants responded very favorably to the format of the training. Almost all respondents strongly agreed that the training reflected careful planning and organization (average rating 3.7). They also strongly agreed that the content of the meeting will be useful to the work they do related to gender equity (average rating 3.7).

II. Content Learning from Session

The next set of questions asked about what the participants learned about STEM equity and the Pipeline project, as well as what they were able to take away from the meeting. Again, responses were mostly positive. Participants strongly agreed that they understand the purpose and goals of the STEM Equity Project (average rating 3.7). They also agreed that they are now familiar with the Five-Step Process, and that the case study that was presented helped them to understand the Five-Step Improvement Program (average ratings 3.4 and 3.5, respectively).

In addition, participants felt that the workshop raised their awareness of the value of quantitative data as a decision making tool for program improvement, and that the discussion of research based root causes led them to want to know more (average ratings 3.4 and 3.3, respectively).

In regards to future work, participants agreed that as a result of the workshop, they are likely to go to the STEM Equity Pipeline website to find resources (average rating 3.6).

They also agreed that the materials and tools used in the presentation will be useful to their work and that the session gave them ideas of what they can do to enhance their work around gender equity in STEM (average rating 3.4, each).

III. Open-ended questions/comments

At the end of the survey, participants were asked to share any additional comments. Only two participants listed comments, listed below:

- Very nice - thanks a lot!
- I have been looking for a project I can be passionate about rather than one that has been thrust upon me. This looks very promising.

IV. Conclusion

Based on the survey responses from the state team members, the session was viewed favorably by the participants and was useful in several respects. Participants felt the session was organized and useful overall. It gave participants a better understanding of the project and the Five-Step Process, as well as introduced them to the resources they can use in their work on gender equity in STEM.

January 27, 2011 Webinar
Spark Talented Minority Girls' Interest in Engineering, Female Recruits Explore Engineering: The FREE Project

On January 27, 2011, Monica Bruning conducted a Webinar entitled, *Spark Talented Minority Girls' Interest in Engineering, Female Recruits Explore Engineering: The FREE Project*. This session focused on introducing participants to the FREE Project as an strategy to increase the number of girls in STEM. The session also aimed to teach participants how to implement the project with an online tool-kit and to review data from research on girls pursuing engineering careers. Out of 245 people who registered, 112 people participated in the webinar. The majority of attendees were female and White, non-Hispanic. Participants included administrators, state education agency staff, teachers, and counselors.

At the end of the webinar, attendees were asked to fill out a brief survey on their webinar experience. Questions came in the form of statements to which respondents noted the degree to which they agreed with them (from 1—"Strongly Disagree" to 4—"Strongly Agree"). Of the 112 participants, 15 completed the survey. Appendix A displays the survey questions and results.

Responses to the webinar were mostly positive. Although several participants had logistical problems connecting the webinar, almost all agreed or strongly agreed that the webinar reflected careful planning and organization and that the webinar's content would be useful to their work related to gender equity (average ratings 3.5 and 3.2, respectively). In terms of specific concepts, most respondents agreed that they have a good understanding of FREE as an intervention strategy to increase the participation of girls in STEM courses and careers (average rating 3.1). They also learned about implementing the project (FREE) with an online tool kit (average rating 3.3). Overall, participants agreed that the session added to their understanding of data focused on research related to girls pursuing engineering careers (average rating 2.9). They also felt that they gained some specific knowledge or skills that they will put into practice (average rating 2.9).

In summary, based on survey responses the webinar succeeded in teaching the participants about the FREE Project. It also succeeded in teaching participants how to use the online tool kit and how to understand related research data. However, because so few participants responded to the survey, these data may not be representative of all who attended the webinar.

February 16, 2011 Webinar
Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets

On February 16, 2011, Fred Smyth conducted a webinar entitled, *Implicit Bias in STEM: The Power of Automatic, Unintended Mindsets*. The session focused on helping participants become acquainted with evidence of the operation of implicit mindsets on important, sometimes life-altering, judgments and decisions. The facilitators also aimed to teach participants about research linking implicit biases to critical STEM outcomes as well as methods for measuring implicit bias in STEM, including the demonstration website for the Implicit Association Test. Out of 136 people who registered, 65 people participated in the webinar. Most of the attendees were female and White, non-Hispanic. Participants included administrators, state education agency staff, teachers, and counselors.

At the end of the webinar, attendees were asked to fill out a brief survey on their webinar experience. Questions came in the form of statements to which respondents noted the degree to which they agreed with them (from 1—"Strongly Disagree" to 4—"Strongly Agree"). Of the attendees, 9 completed the survey. Appendix A displays the survey questions and results.

Responses to the webinar were generally positive. Although a few respondents had logistical problems connecting the webinar, all agreed or strongly agreed that the webinar reflected careful planning and organization and that the webinar's content would be useful to their work related to gender equity (average ratings 3.8 and 3.7, respectively). In terms of specific concepts, respondents agreed that from this webinar they became aware of implicit mindsets in STEM, their measurability and effects (average rating 3.4). They also learned about research linking implicit biases to critical STEM outcomes (average rating 3.3). Further, the session added to the respondents understanding of ways to measure implicit bias in STEM, including the demonstration website for the Implicit Association Test, and taught them strategies for changing implicit biases and combating their negative effects (average ratings 3.4 and 3.2, respectively). Respondents believed that after participating in the session they will adopt a mindset that "nurture" has more of an effect than "nature" on perceptions of STEM ability (average rating 3.3).

In summary, based on survey responses the webinar succeeded in teaching the participants about implicit mindsets. It also succeeded in teaching participants how to measure and change those biases. However, because so few participants responded to the survey, these data may not be representative of all who attended the webinar.

March 22, 2011 Webinar
Cognitive Beliefs and Cultural Variables Matter in STEM Career Development

On March 22, 2011, Angela Byars-Winston, conducted a Webinar entitled, *Cognitive Beliefs and Cultural Variables Matter in STEM Career Development*. This Webinar focused on the relevance of cognitive beliefs and cultural variables on academic and career commitment in science and engineering. Facilitators presented data from studies of underrepresented STEM populations at the undergraduate level and examples of strategies for improving gender equity in STEM. Out of 230 people who registered, 109 people attended in the webinar. Most of attendees were female and White, non-Hispanic. Attendees included administrators, state education agency staff, teachers, and counselors.

At the end of the webinar, attendees were asked to fill out a brief survey on their webinar experience. Questions came in the form of statements to which respondents noted the degree to which they agreed with them (from 1—"Strongly Disagree" to 4—"Strongly Agree"). Of the 109 attendees, 26 completed the survey. Appendix A displays the survey questions and results.

Responses to the webinar were generally positive. Although a few respondents had logistical problems connecting the webinar, most agreed or strongly agreed that the webinar reflected careful planning and organization and that the webinar's content would be useful to their work related to gender equity (average ratings 3.5 and 3.4, respectively). In terms of specific concepts, respondents agreed that they became aware of how social cognitive theory applies to STEM career development (average rating 3.5). They also learned about career development research that has focused on racial/ethnicity minority undergraduates in STEM (average rating 3.6). Further, the session added to the respondents' understanding of ways to increase STEM career interests and commitment to research (average rating 3.3). Respondents felt that the webinar also increased their understanding of ways to reinforce STEM students' academic self-efficacy beliefs and reduce perceived academic barriers, and of ways to reduce academic barriers at different levels (average ratings 3.4 and 3.0, respectively). Lastly, respondents agreed that after participating in the webinar they will be able to adopt one or more of the strategies that were shared (average rating 3.2).

In summary, based on survey responses the webinar succeeded in teaching the participants about cognitive beliefs and on how different cultural variables impact career development. However, because so few attendees responded to the survey, these data may not be representative of all who attended the webinar.

Georgia Pilot Site Facilitator Background Survey Summary

On November 16, 2010, pilot site participants in Georgia were asked to complete a background survey about their prior knowledge of and work around STEM equity. A total of 20 surveys were collected at the beginning of the first in-person training conducted with pilot site participants. The participants who completed the survey included administrators (N = 20), primarily from Atlanta Technical College (N = 6), Heart of Georgia Technical College (N = 3), Middle Georgia Technical College (N = 5), Augusta Tech (N = 3), and Technical College of Southern Georgia (N = 2).

Participants were asked to rate their skills and knowledge on a scale of 1 to 5, with 1 being very little knowledge and 5 being a great deal of knowledge. Overall, participants had moderate knowledge of the current body of research and practice on gender equity in education and career and technical education (M = 2.7), where to find resources about women in STEM (M = 2.6), and strategies for increasing female participation in STEM (M = 2.5). Participants had slightly less knowledge of the current body of research and practice on women and girls in STEM (M = 2.4), and of the five-step program improvement process (M = 2.4). Almost no participants stated that they have a lot of experience in or knowledge of these topics.

The survey also asked participants to rate their knowledge on a variety of topics with 1 meaning they are not familiar with the topic and 5 meaning they have high knowledge of the topic and can teach it to others. On average, participants were moderately familiar with the topics of cultural diversity and gender (M = 3.2), sexism, racism, bias and stereotyping (M = 3.2), teacher expectations (M = 3.2), school climate (M = 3.0), career development (M = 2.9), stereotype threat (M = 2.8), and the impact of gender bias on individuals and society (M = 2.7). Participants were less familiar with the topics of self-efficacy (M = 2.5), brain research (M = 2.4), the status of girls and women in STEM (M = 2.4), spatial skills and visualization (M = 2.1), attribution theory (M = 1.9), and microequalities (M = 1.9). No participants stated that they had a high level of knowledge of the subjects that were less familiar to the group.

Using the same rating scale, participants were asked to rate their knowledge of various strategies, best practices, and models related to gender equity in STEM education. Participants were most familiar with gender fair collaborative learning (M = 3.6), effective instructional practices (M = 3.6), and creating a positive classroom and school climate (M = 3.4). They were moderately knowledgeable about sexual harassment prevention (M = 3.3), bias-free assessment (M = 3.1), face-to-face and online mentoring (M = 3.1), equitable recruitment practices and promotional materials (M = 3.0), parental involvement (M = 2.9), career guidance and counseling strategies (M = 2.9), and support groups (M = 2.9). They were also moderately knowledgeable about essential support services (M = 2.8), peer counseling (M = 2.6), targeted recruitment strategies (M = 2.6), curriculum review for gender bias (M = 2.6), and the effect of culture, race and class on career selections (M = 2.6). Participants were least knowledgeable about early exposure strategies (M = 2.5), conducting a nontraditional career fair (M = 2.5), employer outreach

(M = 2.4), gender equity and leadership for administrators (M = 2.4), pre-technical training (M = 2.3), conducting summer programs (M = 2.3), and single-sex versus co-educational programming (M = 2.2).

Lastly, participants were asked several questions about their training and professional background. Sixty-five percent of the respondents said that they have received some professional development training on the use of data for program or instructional improvement. Of those, almost all (92%) received that training within the last five years. Many of the participants (65%) stated that they have used data in their work to identify performance gaps or to improve their programs. Only a third of the participants (30%) stated that they have received professional development training related to gender equity, but of those all received that training within the last five years. In addition, 30% of the participants have participated in a program designed to increase female participation in STEM or CTE courses and programs.

New Hampshire Pilot Site Facilitator Background Survey Summary

On September 21, 2010, pilot site participants in New Hampshire were asked to complete a background survey about their prior knowledge of and work around STEM equity. A total of 17 surveys were collected at the beginning of the first in-person training conducted with pilot site participants. The survey respondents included elementary school, middle school and college teachers (N = 5), as well as 3 counselors from local middle and high schools. In addition, there were seven administrators from the local community colleges and school district offices, and two administrators from the state Department of Education.

Participants were asked to rate their skills and knowledge on a scale of 1 to 5, with 1 being very little knowledge and 5 being a great deal of knowledge. On average, participants had a low level of familiarity with these items including knowledge of the current body of research and practice on women and girls in STEM and on gender equity in education and career and technical education (M = 2.3). They also had little knowledge of strategies for increasing female participation in STEM (M = 2.2) and about the different resources available including the five-step program improvement process (M = 2.1 - 2.2). Although one participant stated having a high level of knowledge about the available resources, all other rating were 4 or below, meaning that none of these participants has a high level of knowledge or experience in these areas.

The survey also asked participants to rate their knowledge on a variety of topics with 1 meaning they are not familiar with the topic and 5 meaning they have high knowledge of the topic and can teach it to others. Participants were most familiar with teacher expectations (M = 3.6), school climate (M = 3.6), career development (M = 3.5), and cultural diversity and gender (M = 3.5), with almost all participants having some knowledge of these topics. They were moderately familiar with the topics of sexism, racism, bias and stereotyping (M = 3.4), the impact of gender bias on individuals and society (M = 3.2), brain research (M = 2.9), spatial skills and visualization (M = 2.8), self-efficacy (M = 2.8), and stereotype threat (M = 2.8). Participants were least familiar with the status of girls and women in STEM (M = 2.6), microequities (M = 1.8), and attribution theory (M = 1.4). No participants felt they had a high level of knowledge about these three topics.

Using the same rating scale, participants were asked to rate their knowledge of various strategies, best practices, and models related to gender equity in STEM education. Participants were most knowledgeable about creating positive classroom environments (M = 3.6), creating a positive school environment (M = 3.4), and effective instructional practices (M = 3.4). All participants had at least some knowledge of those topics, ranking them 2 or higher. Participants were moderately knowledgeable about parental involvement (M = 3.0), bias-free assessment (M = 2.9), and equitable recruitment practices and promotional materials (M = 2.7). They also expressed moderate knowledge of career guidance and counseling strategies (M = 2.9), sexual harassment prevention (M = 2.9), support groups (M = 2.9), face-to-face and online mentoring (M = 2.6), peer

counseling (M = 2.6), gender fair collaborative learning (M = 2.6), and the effect of culture, race and class on career selection (M = 2.6). On average, participants had a low level of knowledge of pre-technical training (M = 2.3), single sex versus co-ed programming (M = 2.3), curriculum review for gender bias (M = 2.2), essential support services (M = 2.3), employer outreach (M = 2.3), targeted recruitment strategies (M = 2.2), and early exposure strategies (M = 2.1). They also had little knowledge of conducting a nontraditional career fair (M = 2.0), conducting summer programs (M = 2.0), and gender equity leadership for administrators (M = 1.7), with no respondents ranking their knowledge higher than three for the latter.

Lastly, participants were asked several questions about their training and professional background. Sixty-five percent of the respondents said that they have received some professional development training on the use of data for program or instructional improvement. Over half (59%) stated that they have used data in their work to identify performance gaps or to improve their programs. Half of the participants (53%) stated that they have received professional development training related to gender equity. In addition, 29% said that they have participated in a program designed to increase female participation in STEM or CTE courses and programs.

Ohio Pilot Site Facilitator Background Survey Summary

On October 15th and 25th, 2010, pilot site participants in Ohio were asked to complete a background survey about their prior knowledge of and work around STEM equity. A total of 32 surveys were collected at the beginning of the first in-person trainings conducted with pilot site participants. The participants who responded to the survey included teachers (N = 10) and administrators (N = 20) from a variety of institutions. Participants came from Cincinnati State Technical and Community College (N = 2), Columbus State Community College (N = 1), Ponitz Technical Community College (N = 3), Sinclair Community College (N = 4), University of Cincinnati (N = 2), and Washington State Community College (N = 8). Other participants were from local high schools, the YMCA, and state education offices.

Participants were asked to rate their skills and knowledge on a scale of 1 to 5, with 1 being very little knowledge and 5 being a great deal of knowledge. Overall, participants had moderate knowledge of the current research and practice on women and girls in STEM (M = 2.8) and on gender equity in education and career and technical education (M = 2.8). They also had moderate knowledge of strategies for increasing female participation in STEM and about the different resources available (M = 3.0 and 2.9). Participants were less knowledgeable about the five-step program improvement process (M =2.0).

The survey also asked participants to rate their knowledge on a variety of topics with 1 meaning they are not familiar with the topic and 5 meaning they have high knowledge of the topic and can teach it to others. Participants were most familiar with career development (M = 3.7), sexism, racism, bias and stereotyping (M = 3.7), school climate (M = 3.7), cultural diversity and gender (M = 3.6), and teacher expectations (M = 3.5). They were moderately familiar with the impact of gender bias on individuals and society (M = 3.3), stereotype threat (M = 3.3), the status of girls and women in STEM (M = 3.1), self-efficacy, (M = 3.0), spatial skills and visualization (M = 2.7), and brain research (M = 2.5). Participants had less knowledge about attribution theory (M = 2.3) and microinequities (M = 2.3).

Using the same rating scale, participants were asked to rate their knowledge of various strategies, best practices, and models related to gender equity in STEM education. Participants were most knowledgeable about creating positive classroom environments (M = 3.6), effective instructional practices (M = 3.6), both face-to-face and online mentoring (M = 3.4), and parental involvement (M = 3.4). They were moderately knowledgeable about the effect of culture, race and class on career selection (M = 3.2), essential support services (M = 3.1), equitable recruitment practices and promotional materials (M = 3.0), career guidance and counseling strategies (M = 3.0), gender fair collaborative learning (M = 2.9), and bias-free assessment (M = 2.9). They were also moderately knowledgeable about sexual harassment prevention (M = 3.0), targeted recruitment strategies (M = 3.0), conducting summer programs (M = 3.0), early exposure strategies (M = 2.8), employer outreach (M = 2.8), support groups (M = 2.8), pre-

technical training (M = 2.6), peer counseling (M = 2.6), and gender equity leadership for administration (M = 2.5). The participants had less knowledge of single-sex versus co-ed programming (M = 2.5), curriculum review for gender bias (M = 2.5), and of conducting a nontraditional career fair (M = 2.5). Overall, the participants had a wide range of knowledge for each of these items, with all items having some participants at each level of rating scale.

Lastly, participants were asked several questions about their training and professional background. Forty-five percent of the respondents said that they have received some professional development training on the use of data for program or instructional improvement. Most participants (88%) stated that they have used data in their work to identify performance gaps or to improve their programs. Only a third of the participants (34%) stated that they have received professional development training related to gender equity. In addition, 31% said that they have participated in a program designed to increase female participation in STEM or CTE courses and programs.

Texas Pilot Site Facilitator Background Survey Summary

On October 5, 2010, pilot site participants in Texas were asked to complete a background survey about their prior knowledge of and work around STEM equity. A total of 6 surveys were collected at the beginning of the first in-person trainings conducted with pilot site participants. The participants who responded to the survey included administrators from Texas State Technical College ($N = 2$), Clarendon College ($N = 2$), Amarillo College ($N = 1$), and Alvin Community College ($N = 1$).

Participants were asked to rate their skills and knowledge on a scale of 1 to 5, with 1 being very little knowledge and 5 being a great deal of knowledge. Overall, participants had moderate knowledge of where to find resources about women in STEM ($M = 3.2$), the five-step program improvement process ($M = 3.2$), and strategies for increasing female participation in STEM ($M = 2.8$). Participants had slightly less knowledge of the current body of research and practice on women and girls in STEM ($M = 2.5$) and of research and practice on gender equity in education and Career and Technical Education ($M = 2.5$). Almost no participants stated that they have a lot of experience in or knowledge of these topics.

The survey also asked participants to rate their knowledge on a variety of topics with 1 meaning they are not familiar with the topic and 5 meaning they have high knowledge of the topic and can teach it to others. On average, participants were most familiar with the topics of the impact of gender bias on individuals and society ($M = 3.8$), stereotype threat ($M = 3.7$), and sexism, racism, bias and stereotyping ($M = 3.5$). Participants were moderately familiar with the topics of school climate ($M = 3.3$), the status of girls and women in STEM ($M = 3.3$), attribution theory ($M = 3.2$), career development ($M = 3.2$), teacher expectations ($M = 3.2$), and cultural diversity and gender ($M = 3.0$), Participants were less familiar with the topics of brain research ($M = 2.8$), self-efficacy ($M = 2.8$), spatial skills and visualizations ($M = 2.5$), and microinequalities ($M = 2.3$) A few participants were very familiar with most of these topics.

Using the same rating scale, participants were asked to rate their knowledge of various strategies, best practices, and models related to gender equity in STEM education. Participants were most familiar with creating positive classroom climate ($M = 3.5$), effective instructional practices ($M = 3.3$), bias-free assessment ($M = 3.2$), sexual harassment prevention ($M = 3.2$), gender fair collaborative learning ($M = 3.0$), creating a positive school environment ($M = 3.0$), and career guidance and counseling strategies ($M = 3.0$). They were moderately knowledgeable about parental involvement ($M = 2.8$), essential support services ($M = 2.8$), targeted recruitment strategies ($M = 2.5$), equitable recruitment practices and promotional materials ($M = 2.3$), mentoring ($M = 2.3$), curriculum review for gender bias ($M = 2.3$), employer outreach ($M = 2.3$), support groups ($M = 2.3$), effect of culture/race/class on career selection ($M = 2.3$), early exposure strategies ($M = 2.2$), peer counseling ($M = 2.2$), and gender equity leadership for administration ($M = 2.2$). Participants were least knowledgeable about single-sex

versus co-ed programming ($M = 2.0$), conducting summer programs ($M = 2.0$), conducting a nontraditional career fair ($M = 2.0$), and pre-technical training ($M = 1.8$).

Lastly, participants were asked several questions about their training and professional background. Two-thirds of the respondents said that they have received some professional development training on the use of data for program or instructional improvement. One-third of the participants stated that they have used data in their work to identify performance gaps or to improve their programs. Two-thirds of the participants stated that they have received professional development training related to gender equity and have participated in a program designed to increase female participation in STEM or CTE courses and programs.

Evaluation Report
Blueprint for Micromessaging: To Reach and Teach Every Student
Professional Development Program
by
Jane Butler Kahle
Submitted on June 27, 2011

Background

The National Alliance for Partnerships in Equity Education Foundation (NAPE-EF) received support from the National Science Foundation to explore new directions and needs in equity education. One year was devoted to establishing a collaborative team and developing the *Micromessaging to Reach and Teach Every Student Blueprint*[1] that will guide future efforts by NAPE and others concerned with professional development programs that "address gender- and culturally-based implicit biases that occur in the classroom and that are manifested through 'micromessages' (p. 5). As articulated in the document, "***The goal*** of the ***Micromessaging to Reach and Teach All Students*** is to increase the academic performance and retention through program completion of significantly more racially and ethnically diverse female students in Science, Technology, Engineering and Mathematics (STEM) careers" (p. 14).

This report spans the time period from Summer 2010 through June 2011. It is based on observations made at two national meetings (July 20, 2010 and April 15, 2011), numerous conference calls, and reviews of various documents over the course of the year. It also provides a synthesis of the findings from a Needs Assessment, conducted in March 2011, and of responses to the questionnaire at the April 15, 2011 Micromessaging Expert meeting. In addition, it reviews an instrument, developed for the professional development program. The evaluation also submitted the prototype for the evaluation matrix, found in the *Blueprint.*

Findings

The project used a comprehensive and coherent approach to the development of a professional development program focused on micromessaging. The professional development program (described in the *Blueprint)* is grounded in the relevant research and builds upon previous efforts by NAPE and by other professional development providers. Leaders at NAPE recruited a strong group of professionals to contribute to the development of the professional development program and involved the Departments of Education in three states and one private foundation in the process. An early change in direction that involved redefining both the central

[1] All page numbers in this document refer to page numbers in the *Blueprint,* distributed on 6/13/2011.

goals and the implementation strategies of the emerging professional development program expanded its direction. The two national meetings brought together diverse (both in perspectives and in educational expertise) leaders from across the country. In addition, extensive use was made of electronic communication throughout the year.

This report synthesizes findings from two surveys: the Needs Assessment and the questionnaire at the Expert Meeting in April. In addition, a brief final review of an evaluation instrument, developed for the professional development program, and of the *Blueprint for Micromessaging: To Reach and Teach Every Student Professional Development Program* are included.

Micromessaging Needs Assessment

In order to be certain that the emerging professional development program would meet the needs of teachers, a Needs Assessment was conducted in March 2011. Teachers in Maryland, many of whom had been active in previous equity projects (CISCO and PLTW), responded to an online assessment through Survey Monkey. E-mails, informing teachers of the availability and location of the questionnaire were received by 113 teachers, 50 of whom responded for a response rate of 44%, a high response rate for an online survey. The Needs Assessment may be found in Appendix 1 of the *Blueprint.* Findings have been used in finalizing the *Blueprint*.

Over 74% of the respondents were male, and most taught grades 10, 11 and 12 with 80% indicating that they taught 12th grade[2]. Almost half (47.7%) of the respondents taught Project Lead the Way's (PLTW) *Introduction to Engineering Design* course, and one third taught the capstone course in PLTW, *Engineering Design & Development*. Approximately 30% indicated that they taught *Digital Electronics* (PLTW), *Engineering Design and Development* (PLTW), *Networking for Home and Small Business* (CISCO), and/or *PC Hardware and Software* (CISCO)[3] Considering high school courses that were not part of CISCO or PLTW, most respondents taught a pre-engineering or a technology course.

Respondents indicated the <u>least familiarity</u> with the following issues.

- *Micro-messaging in K-12 STEM classrooms (67.5% responded 'some'* or *'none'),*
- *Gender bias in computer games and stimulations (53.7% responded 'some'* or *'none),*
- *Research concerning the neuroscience link to learning (52.5% responded 'some'* or *'none'),* and
- *Attribution differences among different groups of students (gender, race, ethnicity) (30.8 responded 'some').*

[2] Responders could mark more than one grade.
[3] Respondents could mark more than one course.

These responses indicate important points to be included in the professional development program.

The teachers indicated high understanding of the following two issues.

- *Under-representation of girls in advanced STEM courses* (86.1% *agree/strongly agree)*
- *Under-representation of women in STEM careers* (77.1% *agree/strongly agree)*

In addition, over half of the teachers indicated that they understood the following issues by responding *agree* or *strongly agree)*.[4]

- *Pedagogy that enhances learning in STEM classrooms (50%)*
- *Parental and early childhood influences on learning (63.7%)*
- *Societal influences on girls' course and career decisions (58.9%)*
- *Influence of role models and mentors on career choices (64.1%)*
- *Under-representation of minority students in STEM advanced courses (56.4%)*
- *Under-representation of minorities in STEM careers (53.8%)*

These issues indicate topics that teachers, who are involved with equity projects, understand and ones that provide the foundation of the professional development program.

Another item asked teachers to indicate their experience with activities that help provide equitable experiences for all students. Responses indicated that the teachers had <u>never</u> experienced the following activities.

- *Talked with my school's guidance counselor about the classroom performances of diverse students (26.8%)*
- *Met with parent/adult groups to discuss equity issues in STEM (47.5%)*
- *Met with groups of interested teachers to discuss equity issues in STEM (36,6%)*

These responses clearly suggest needed directions/activities for the professional development program.

In addition, the assessment probed the type of professional development that is preferred by teachers. Responses were fairly evenly split across 4 of the 5 options[5], with the fewest number of teachers indicating interest in *Participating in an online discussion group on equity issues.* Over 60% of the teachers responded that they

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[4] The two response categories have been combined in the percentages presented. The percentages may be high due to self-report bias.

[5] The professional development options were: Online, Combined on-line and face-to-face, Face-to-face, Action research in teacher's classroom, and Participating in an online discussion group.

preferred receiving continuing education units (CEUs) to graduate credits or to certification renewal credits.[6]

In summary, the Needs Assessment provided clear indications of the strengths and weaknesses of practicing teachers concerning equity issues. Further, responses suggest the types of activities that will be useful in reaching the goal of the professional development, stated in the *Blueprint*.

Evaluation of Micromessaging Expert Meeting, April 15, 2011

The equity experts at the April 15th meeting responded to a 13-item questionnaire concerning the effectiveness of the information provided, the time allotted, and the expectation of using the materials/information presented. The questionnaire is provided at the end of this report. Nine questionnaires were received; three of which were completed by panelists. Responses to the 13 items used a five-point scale, ranging from 1 *(strongly disagree)* to 5 *(strongly agree).* Overall, the meeting was highly successful. All respondents *agreed* or *strongly agreed* with the following statements.

1. *The meeting reflected careful planning and organization,*
2. *Initial content was useful in creating a framework for discussion,*
3. *Information presented provided a foundation,*
4. *Participants provided a diversity of perspectives,* and
5. *Understand the goals and expected outcomes of the Micro-messaging Professional Development Program.*

Responses to the other items fluctuated more; however, all indicated satisfaction with the meeting and expectations of continuing to work (and use the meeting's materials) in the equity area.

Micromessages: Conveying Implicit Bias in the Classroom Peer Environment

Dr. Tara Ebersole, Community College of Baltimore County, developed a Peer Evaluation instrument for use in future projects and the professional development program, described in the *Blueprint*. It may be found in Appendix 2 of the *Blueprint*. A review indicates that accurate and interesting information, concerning equity strategies and activities at the classroom level, may be collected with it. In addition, because it is to be used by teachers who are evaluating their peers, it has the added value of involving teachers in equity research and of whether or not they are using equitable practices. The evaluation has one minor suggestion for the instrument; that is, both **Ethnicity** and **Race** items should be answered in numbers.

[6] Few teachers were interested in professional development without any type of credits.

Micromessaging to Reach and Teach Every Student Blueprint

Key findings of the research as well as those of experts form the foundation of the *Blueprint.* For example, Jo Sanders' projects in Dallas and Plano, TX provided the prototype for the instructional materials. In addition five existing state and/or national equity efforts were reviewed prior to developing the micromessaging professional development program. Clear goals and objectives are articulated to guide professional development providers. The professional development, described in the *Blueprint,* is intended for secondary and post-secondary (especially community college) educators in public institutions. Key elements of the teacher professional development, iterated in the document's Executive Summary, are based upon findings from the teacher Needs Assessment. In addition, workshop components are based on findings from the Needs Assessment. For example, a three-day workshop for which teachers will receive CEUs or graduate credits is described. The resulting document provides clear guidelines, suggested workshop agendas, and professional development activities and materials.

Summary

Both the process and the products of the NAPE-EF effort to develop the *Blueprint* for a professional development program have been evaluated. The resulting *Blueprint* is based upon relevant research, incorporates the views and advice of a variety of experts, and includes the findings of the Needs Assessment. The process was extensive and involved a diverse group of people in two face-to-face meetings and in many electronic conversations. Instruments, developed to gather data for the *Blueprint,* have been effectively used. The project successfully met its goals and those of the NSF—GSE Extension Services' supplement which provided funds for its effort.

National Alliance for Partnerships in Equity Education Foundation

Micromessaging Expert Meeting

To obtain feedback about the content of this meeting, we would appreciate your honest answers to the following questions. The information you provide is confidential and is only used to evaluate the effectiveness of the workshop.

Were you a presenter/panelist? **Yes_____** **No_____**

To what extent do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. The meeting reflected careful planning and organization.	❑	❑	❑	❑	❑
2. The initial content of the meeting was useful for creating a framework for discussion.	❑	❑	❑	❑	❑
3. The information presented from the various presenters provided a foundation for my thoughts and remarks.	❑	❑	❑	❑	❑
4. The participants at the meeting provided a diversity of perspectives.	❑	❑	❑	❑	❑
5. I understand the goal and expected outcomes of the Micromessaging Professional Development Program.	❑	❑	❑	❑	❑
6. The Blueprint provides an effective map for developing training for STEM teachers.	❑	❑	❑	❑	❑
7. I was able to provide feedback as I wished on the following topics:	❑	❑	❑	❑	❑
a. Five Key Program Elements	❑	❑	❑	❑	❑
b. Goals and Objectives	❑	❑	❑	❑	❑
c. Target Audience	❑	❑	❑	❑	❑
d. Program Features, including the five phases	❑	❑	❑	❑	❑
e. Content Integration and Format	❑	❑	❑	❑	❑
f. Evaluation Model	❑	❑	❑	❑	❑
8. I was knowledgeable about most of the content presented.	❑	❑	❑	❑	❑
9. The Micromessaging Professional Development Program may be useful to me in my work.	❑	❑	❑	❑	❑
10. This meeting gave me ideas of what I can do to enhance my work related to programs and services to underrepresented females in STEM courses and careers.	❑	❑	❑	❑	❑
11. Given the importance of the topic, the amount of time for the meeting was insufficient.	❑	❑	❑	❑	❑
12. I am interested in exploring mutually beneficial opportunities with NAPE-EF since learning about the Micromessaging Program.	❑	❑	❑	❑	❑

Please use the space on the back of this sheet to make any comments. If you would like a response, please include your name and contact information.