AC 2008-1683: WEPAN'S DIGITAL WOMEN IN ENGINEERING KNOWLEDGE CENTER

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WEPAN's Digital Women in Engineering Knowledge Center

Abstract

The mission of the Women in Engineering ProActive Network, (WEPAN) is to be a catalyst, advocate, and leading resource for institutional and national change that enables the success of all women in engineering. In support of this mission, WEPAN is leading an effort to create a digital Knowledge Center focused on women in engineering. Many resources about women in engineering exist, but they are scattered, and often not easily accessible by stakeholders and practioners who need information to develop and assess policies, intervention activities and research programs. Supported by a National Science Foundation Engineering Education and Centers (EEC) grant (#0648210), the WEPAN Knowledge Center (WKC) will be designed to serve as a central repository by collecting and offering ready access to research; best practices and lessons learned; data and information. Moreover, the WKC will create knowledge and provide leadership in key policy areas in the form of white papers, as well as provide tools for capacity building, including webinars and blogs. It will be designed to serve a wide audience, including engineering deans, department chairs, and faculty interested in recruiting faculty and students, as well as decision support systems. Corporate diversity officers, human resource specialists and university relations officers will benefit from information on recruitment, outreach, and trends; foundations, corporations, and associations interested in collaborating on solutions to the issues associated with the success of women in engineering, as well as directors of engineering education programs interested in improving programs and performance. Collaborating with WEPAN on this project are a variety of other national organizations, including the Commission on Professionals in Science and Technology, the American Society for Engineering Education, and the American Association for the Advancement of Science's Center for Advancing Science and Engineering Capacity /AAAS Capacity Center.

Introduction

It's no secret that the U.S. engineering workforce has a shortage of female engineers—only 9% of today's engineers are women. The picture is not much better among university professors—only 6% are women. And among undergraduate students, only 17% of the aspiring engineers are female, even though 56% of the U.S. college students are women. This picture will not help the U.S. meet projected high demand for engineers in the knowledge based economy of the future. Clearly one solution to this problem is to increase the number of women who choose engineering as their major in college.

There are a number of efforts at national and local levels that address this issue. However, one missing component is a nationwide vehicle to share what works, how much progress we are making, and gaps in knowledge and information. WEPAN, Women in Engineering ProActive Network, is leading an effort to develop a resource to meet the need for readily accessible information and communication about women in engineering. Funded in 2007 by a National Science Foundation Engineering Education and Centers (EEC) grant (#0648210) WEPAN is building a digital Women in Engineering Knowledge Center (WKC) focused on informing research, practice and institutional change related to women in engineering. The WKC will be a

national repository of information, data, best practices, and white papers on issues related to women in engineering. In addition, the WKC will serve as a capacity-building tool, where communities of people and groups working to address these issues can connect, share best and promising practices and support one other's programs. In this paper, we outline the history of this project, the progress-to-date, as well as future work.

History

WEPAN is a national not-for-profit 501(c)(3) founded in 1990 and headquartered in Denver, Colorado, WEPAN has over 600 members representing 176 academic institutions, 60 corporations (including both small businesses and Fortune 500 companies), government agencies and non-profit organizations.

In 2005, WEPAN's Board of Directors redirected the organization's strategy to proactively focus on effecting change within institutions of higher education, as well as being a leading resource for women in engineering and women in engineering programs. To realize these goals and, to serve institutional, individual, organizational and corporate communities a task force developed the conceptual framework for the digital WKC center. Task Force members were Barbara Bogue, (chair), Daryl Chubin, Sheila Edwards Lange, Ruta Sevo and Sherry Woods.

In 2007, a successful proposal was developed and funded by the National Science Foundation's Engineering Education and Centers Program. WEPAN Executive Director Diane Matt is PI and Jenna Carpenter, Louisiana Tech University is Co-PI. Partnering with WEPAN on this project are several national organizations, including the American Society for Engineering Education (ASEE), the Commission on Professionals in Science and Technology (CPST), and the American Society for the Advancement of Science Center for Advancing Science & Engineering Capacity (AAAS CASEC), in addition to the Louisiana Tech University College of Engineering and Science.

The following graphic summarizes the key areas of the WKC:

Knowledge Center: Women in Engineering
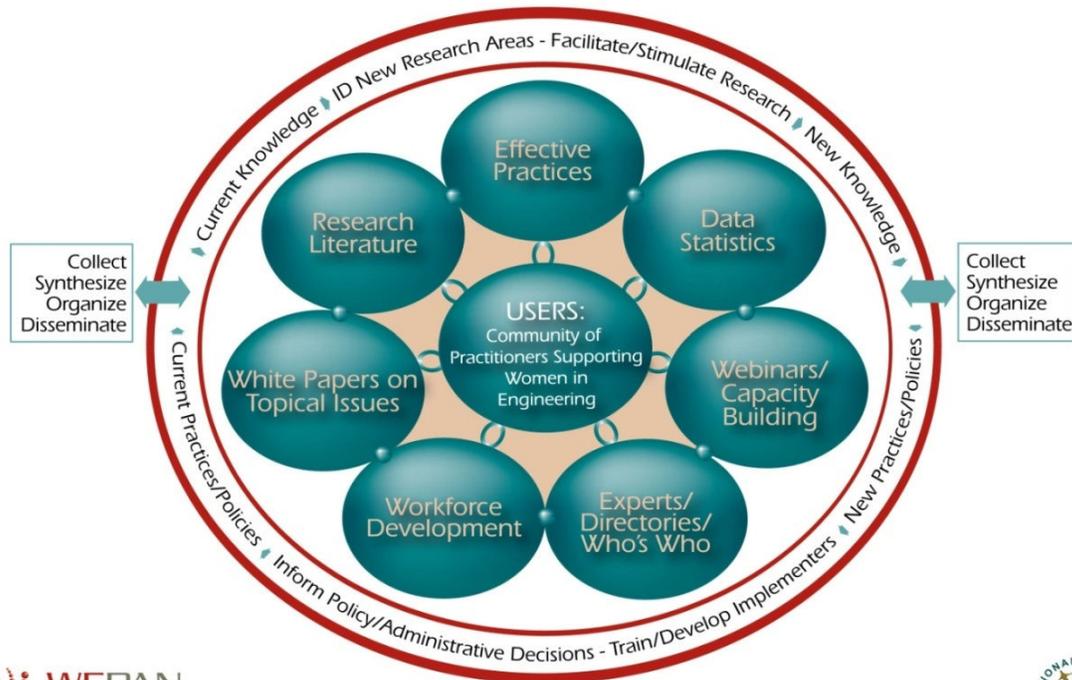
National Science Foundation - Engineering Education and Centers Grant #0648210

Purpose and Audiences

The WEPAN Knowledge Center (WKC) is intended to serve as a central repository by collecting and offering ready access to research; best practices and lessons learned; data and information. Moreover, the WKC should create knowledge and provide leadership in key policy areas in the form of white papers, as well as provide tools for capacity building, including webinars and blogs.

The WKC aims to serve a wide audience, including engineering deans, department chairs, and faculty interested in recruiting faculty and students, as well as decision support systems. Corporate diversity officers, human resource specialists and university relations officers should benefit from information on recruitment, outreach, and trends; foundations, corporations, and associations interested in collaborating on solutions to the issues associated with the success of women in engineering, as well as directors of engineering education programs interested in improving programs and performance.

Progress

Established National Advisory Board: The WKC project, funded in summer of 2007, has assembled a national team of expert advisors for the project, including original task force members Barbara Bogue, Daryl Chubin, and Sherry Woods, in addition to Tricia Berry Yolanda

Comedy, Peggy Johnson, Patricia Eng, and liaison Jenna Carpenter. This Committee holds monthly teleconferences to discuss and advise on project issues and provide overall oversight on the project.

Developed Database Policy Guidelines: The purpose of the WKC is to create knowledge and to provide leadership in key policy areas and information on issues related to increasing women's participation in engineering. There are many sources of information relevant to this purpose in libraries, publications, and websites. *The purpose of the WKC Database is to consolidate and concentrate the most relevant material. In support of this objective, preliminary database policies have been written. They include:*

- Criteria for Selection of Entries
- Potential for Duplication with Other Sites
- Sources for New Entries
- Types of Materials and Types of Entries
- Database Fields for All Types of Materials
- Presentation/Citation Format
- Thematic Outline of Headings
- Full Indexing and Retrieval Strategy
- Indexing for Intended Audience
- Strategy for Assisting Visitors in Navigation
- Links to Related Organizations, Websites, Databases, List serves, and Webinars
- Databases for Internships-Scholarships-Fellowships-Jobs-Experts
- Types of Materials – Detail
- Indexing Guide
- Related Websites, List serves, Blogs, Organizations

Selected Software Platform: One of the important early decisions of the Committee has centered on evaluating and selecting an appropriate software platform to house the project. The software platform must have the capability to support the knowledge function of the WKC, as well both enable and support the community-building aspect of the project. In order to accomplish these twin goals, the Committee has elected to use Community-of-Practice (COP) software. WKC is an "online knowledge management and collaboration software"[1] designed for "communities of practice and knowledge networks"[2].   With a WKC "it becomes possible to tap into and utilize the collective knowledge of a group. Communities of practice represent collections of people that share common professional objectives and whose collaborative relationships support the organization's goals. Among the many benefits of supporting and growing these communities are:

- Capturing knowledge
- Sharing best practices
- Solving problems quickly
- Driving Innovation
- Enabling professional development

Project personnel explored the development of an in-house software package, as well. A custom database solution would require considerably more expertise on the part of the project leaders. In addition, it does not afford an easy, cost effective mechanism for expanding the capability or features of the software. The selected commercial WKC package provides seamless updates to incorporate new features and aspects of the web-based community building that are included in annual maintenance costs. In contrast, custom software Web 2.0 social networking capabilities (such as blogs, social bookmarking and tagging, etc.) are generally programmed as add-ons, versus built into the fabric of the software. As a result, their effectiveness in community building is expected to be limited. There are a number of WKC packages, including Tomoye ECCO, ICohere, MyAmphi, and HigherLogic. Based on expert recommendations, the Committee has selected Tomoye ECCO. Tomoye has an extensive customer list, including government and military clients, along with other non-profits organizations. The software will support over 10,000 users, administrator training, etc.

Developed Working Paper Topics: Another major focus of the Committee's work has centered on the development of working papers. White papers will be authoritative reports, five to ten pages long, written in lay terms, that address major issues. They aim to support and catalyze policy analysis/creation and increase public understanding. White papers, for example, supported the work of the Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology in 2000, providing quality input to a complex discussion and report (CAWMSET, 2002). A minimum of eight white papers are planned. These working papers will address and illuminate key issues relating to women in engineering, by synthesizing research results, putting data and statistics into context, drawing connections among research and best and promising practices, and acting as the foundation for engaging a community of practice for the purpose of bringing more usable data, information, knowledge and wisdom to the task of policy making, practice improvement. Working papers will include: overviews of existing practices and research stressing applicability to problem solving; briefs on emerging areas; collect knowledge and identify areas where more data or research is needed; and provide new insights into continuing issues and problems that can be revealed through statistical reports. Topics are currently being evaluated and priorities are being set. WEPAN is partnering with experts in organizations, such as CPST, ASEE, and AAAS CASEC, among others on this aspect of the project.

Identified Partners to Provide Statistical Knowledge: The WKC team has held initial conversations with two key providers of data and statistics—ASEE and CPST. Working with these two organizations will provide both institution-specific and aggregated statistics relevant to diversity in engineering. Additional value will be brought as data mining and more focused data-based research is conducted using these statistics.

Launched Search for Knowledge Management Librarian: The Knowledge Management Librarian will serve a key role in WKC development. WEPAN developed a solicitation in cooperation with library professionals from Auburn University and posted it to several national library career search websites. A search team has been formed and applicant evaluation, interviews and selection will be completed in spring 2008.

Future Work

Much work remains for the WKC. The community-building aspect of the WKC will provide exciting opportunities to uniquely link the knowledge (content) and wisdom (expertise). The WKC software has the capability to link and engage a number of communities focused on a variety of key issues, using Web 2.0 capabilities such as discussion forums, blogs, social bookmarking and social tagging, etc. Determining how best to design and integrate these resources for maximum effectiveness will be a large task. The use of WKC software will also require a small team of trained volunteers for each community, as well as oversight by site-wide administrators and librarian. Effectively recruiting, training and supporting these key personnel will also be key to the success of the WKC. In addition, populating the site with content, both knowledge, in the form of research literature, best practices, data, white papers, directories, and communities will require time, energy and careful planning. Given that most users are not familiar with the concept of WKC software, site design, which maximizes access to content, encourages community-building, and facilitates ease of use, will be important. Lastly, significant planning will be necessary to ensure an effective and successful roll-out of the WKC. Each of these challenges also provides exciting opportunities, however, to build a new and innovative system to support and advance institutional change related to women in engineering.

Conclusion

During the first eight months of the WKC project, significant project ramp up has occurred as a necessary foundation for WKC construction. Next steps include effectively designing and developing the site, recruiting and training additional personnel, and planning a successful roll-out—all of which will be key to the long-term success of the project.