

**AC 2010-2412: DISSEMINATION, ONLINE COMMUNITY AND USAGE OF  
WEPAN KNOWLEDGE CENTER**

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# WEPAN's Digital Women in Engineering Knowledge Center

## Abstract

The WEPAN Knowledge Center (WKC) offers several avenues for researchers and practitioners to improve dissemination activities as well as research and practice. The WKC Professional Community can be used for private communities of research teams as well as project groups and participant groups. This paper will present an overview of these opportunities as well as usage statistics for the WKC that demonstrate significant audience response to such dissemination and project activity.

## Introduction

WEPAN 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 has built a digital Women in Engineering Knowledge Center focused on informing research, practice and institutional change related to women in engineering. The WEPAN Knowledge Center, launched in April 2009, serves as a national repository of links to resources, reports, books, organization profiles, data, and best practices on issues related to women in engineering. In addition, the Knowledge Center serves 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. This paper presents an overview of these opportunities as well as usage statistics for the WKC that demonstrate significant audience response to such dissemination and project activity

## Research on Professional Communities

Knowledge gained from research related to women in engineering is not disseminated to its own community or the general public as adequately as possible, asserts an audit report from the National Science Foundation, Office of Inspector General (2006), related to NSF policies on accessing results of NSF-funded research. While many programs share results with those in their own community by means of conferences, presentations, and articles; more extensive dissemination would broaden the impact of NSF grant findings and other similar research efforts. The WEPAN Knowledge Center Professional Community is an online solution to address challenges such as dissemination and additional issues such as sharing information on grants received, best practices in doing research and designing programs, and building a space for community interaction.

(4 screen shots and graphics to illustrate this section have been omitted because they contain identifying information about the authors/organization which cannot be removed; they will be inserted into the final paper, should the reviewers recommend that this paper be accepted).

Specifically, in addition to an online collection point for important resources related to women in engineering, the WEPAN Knowledge Center Professional Community provides a space in which to share interests, identify experts, mentor, and collaborate. Moreover, it provides the

opportunity to develop customized online communities of practice for project, research committee and other shared interest communities.

Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (Wenger, 2006). Wenger identifies some of the activities of communities of practices as problem solving, discussions, mapping knowledge and identifying gaps, and seeking information. The women in engineering community can be viewed as a community of practice. In addition, specific groups within the women in engineering community-at-large can also be viewed as communities of practice. These parties have shared interests and the need to learn from each other to affect desired and needed change on the many issues related to women in engineering. Building an online community is one way to accomplish some of the activities listed above by Wenger. Social media and social networking have increased the effectiveness of communities of practice by providing an online forum and tools to interact, learn, mentor, discover, and do so in a very personal way regardless of geographical location.

The social capital created by collaborating and networking at face-to-face events, such as conferences, the NSF ADVANCE PI Meeting, and the NSF JAM (Joint Annual Meeting), diminishes over time when the excitement and synergy from the annual meeting dissolves after individuals return home to their lives and work. Social capital can be increased instead of decreased if an online community is formed, nurtured, and maintained. When communities make the jump from traditional face-to-face gatherings to online communities, they create many new opportunities. Research has shown that internet usage in a community setting can strengthen attachment, community engagement, and social contact (Kavanaugh, 2006).

As the social media phenomenon continues to explode, groups of people are coming together in ways previously unknown and unexplored for a multitude of reasons. Social networking is still a new practice, but is gaining in popularity by leaps and bounds. From August 2008 to August 2009, internet users tripled the amount of time spent on social networking sites (Nielson, 2009). A mainstream jump from personal to professional social networking is now occurring and is now acceptable, and even desirable, for companies and professional organizations to implement social networking and social media to bring people together to communicate and solve problems.

The success of online communities is not accidental, nor is it guaranteed. Guidelines and rules are being developed as we progress. Experts are emerging and information being published about social media at a staggering rate. New fields and job descriptions have been created to develop and maintain this industry, including community managers, online knowledge managers, and content managers. Through the noise some of the more important messages are being heard, one of which is, just because you build it does not mean “they will come.” (Connor, 2009). It is critical in launching a new community that there be someone to guide its direction, welcome members, encourage input, plan editorial content, grow the community, and help to sustain it. Connor stresses the importance of a long-term commitment and the appropriate investment of resources. Scott Monty, head of Social Media for Ford Motor Company, warns that a social media plan will not be successful without support from senior leadership. Clearly, social networking can be an invaluable asset to a community, but must be well planned, designed, and

implemented. The WKC repository and community site is tested, supported, marketed, and maintained by professionals.

Members of the women in engineering community can form interest groups, hold discussions, post documents, ask questions, and create a level of participation and connectedness not currently available to them. The six valuable attributes of social media according to Postman (2009) are authenticity, transparency, immediacy, participation, connectedness, and accountability. When these attributes are practiced, online communities have a much higher chance of success.

Benefits of online communities are many. As Erik Qualman describes in *Socialnomics* (2009), people value the opinion of other people, especially those in their networks. The level of trust is high among community members, which allows individuals to leverage success of their co-community members and accomplish objectives easier and faster. Social capital is bridged when individuals belonging to one group form weak ties to those in other groups (Granovetter, 1973). This allows a community to grow by leveraging ties with other groups, whether directly or indirectly related. The true power of social networking is the reach and depth of communication in an unforced, timely manner.

### WEPAN Knowledge Center and Professional Community

The WKC was launched in June, 2009, providing an organized and annotated digital venue for selected information resources for women in STEM community. In addition, a professional community was established providing an arena for professional interactions among like-minded peers. Development of the WKC was funded by NSF grant #0648210. ([www.wepanknowledgecenter.org/](http://www.wepanknowledgecenter.org/))

#### Figure 1. WEPAN Knowledge Center Homepage Screenshot.

From the WKC homepage, a web visitor can locate and view over 800 (as of November 2009) information resources in the WKC information repository through Browse and Search interfaces. Information resources are annotations for resource types such as articles, books, literature reviews, U.S. national reports or narrative profiles of organizations, programs and projects, database tools.

The WEPAN Knowledge Center Information Repository and Professional Community platform is an effective mechanism for disseminating grant-related information resources and connecting the people responsible for creating them with both their peers and the public outside the project silos that currently exist.



**Figure 2. Example of Annotated Resource.**

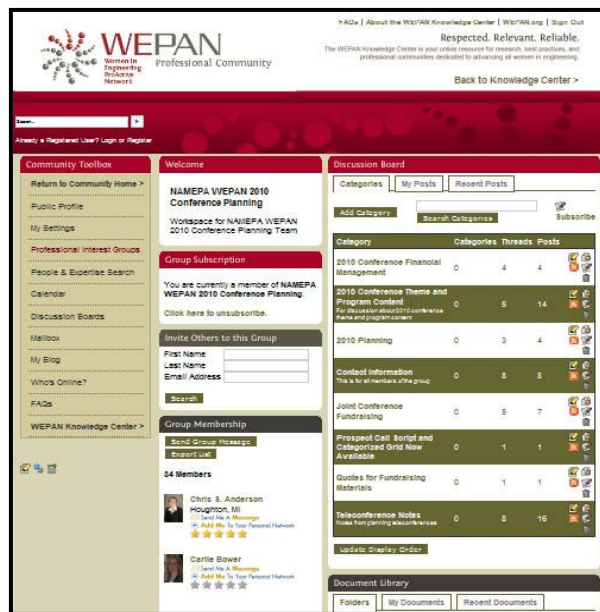
Information resources can be accessed from the annotations and profiles via links to non-WKC repositories containing the resource. Copies of information resources can also be stored in the WKC database with appropriate copyright permissions. Information resources are added to the WKC by online submissions from any WKC Professional Community registered user, the WEPAN Knowledge Management librarian, or WEPAN content sub-contractors.

A web visitor enters the WEPAN Knowledge Center Professional Community via a login link on the WKC homepage. The WKC Professional Community has its own homepage that contains tools to manage one's profile, and access community-wide resources such as an internal mailbox, calendar, discussion board, message board, blog, and people/expertise search.



**Figure 3. Professional Community Homepage and Sample Discussion Forum.**

The WKC Professional Community homepage provides access to interest groups for peer collaboration and interaction. Any community member can create an interest group and select whether the group is open for any registered user to join or by invitation only. Each interest group has its own page from which collaboration and communication can occur asynchronously with other interest group members.



Some interest groups focus on specific topics, such as resources and programs for Engineer's Week and "Introduce a Girl to Engineering Day". Others have been created for use by teams of individuals, sometimes scattered geographically, focused on a specific project, such as a grant or planning a conference. Still others target specific groups of individuals with a common interest, such as the NSF ADVANCE Principal Investigators. Some groups have been created by Professional Community members. Others were created to serve participants in specific webinars who wish to post questions, share resources, etc., after the webinar concludes.

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. Consequently, the resources, information, data and Professional Community are open to anyone. The ASEE Data Mining Tool, provided to WEPAN's members through the WKC is the only resource not publicly available. The Professional Community does require a simple registration (name and e-mail) to contribute content, post questions or join a professional interest group. This is primarily to discourage misuse. Collaborating with WEPAN on this project are national organizations, including the American Society for Engineering Education.

The WKC has developed a web "widget" that can be easily embedded in any external organization's website to allow a user to browse WKC resources while remaining on the hosting website. With extensions, the "widget" can be embedded on any website, allowing users to browse WKC resources while remaining on that site. The widget can also contain a link that will transfer a web visitor to the Professional Community. The user will be prompted for a WKC login before the transfer will be completed.

### **Statistics on Usage**

The WKC was launched with approximately 500 information resources spanning organizations, projects, publications, and authors. As of this writing, the number of resources exceeds 800. The WKC Professional Community was primarily seeded with 500 WEPAN members. Since that time, the Professional Community has grown to 855 members through marketing efforts such as monthly newsletters and frequent webinars to targeted communities.

While the usage statistics (collected via Google Analytics) change on a daily basis, as of early January 2010, there have been just under 11,000 users and over 124,000 page hits on the site, with users from 90 different countries. Just over 4,800 people are new users (around 45%), with the balance (over 5,900) being returning users. Approximately 2,300 of those found the WKC through internet search engines (approximately 76% of all new users). Number of page views, time on site and bounce rates have remained fairly steady over the last half of 2009. The average number of page views per person is 11.45 (6.42 for new users, 15.55 for returning users, 4.77 for search traffic). Average time on site is 10.22 minutes (5.05 for new users, 14.42 for returning

users, and 3.42 for search traffic). The bounce rate overall is 34.02% (46.80% for new users, 23.59% for returning users, and 54.93% for search traffic).

Monthly webinars have been held since September 2009, focusing on resources such as the ASEE Data Mining Tool, an overview of the Knowledge Center itself, as well as how to host an 'Introduce a Girl to Engineering Day' program. In addition, numerous webinars have been held for specific audiences to help them understand the function and structure of the Knowledge Center, as well as how both the resources and the Professional Community can be of value to the accomplishment of their goals and the support of their group. Webinar attendance has ranged from under ten participants to more than 40 people. On several occasions, participants from other countries have attended a webinar.

### **Future Projects**

The WEPAN Knowledge Center continues to partner with other groups and organizations to develop innovative ways to utilize the Professional Community to catalyze and support changes. One such effort is to create personalized, branded communities to provide an environment to encourage and develop relationships and collaboration. These are designed to support shared work-in-progress, results, and professional network in order to create more cohesion, leverage knowledge gained, broaden experience with promising practices, and generally increase visibility of issues or interest. These branded communities should also facilitate the transfer and translation of research into practice. One such community is in process, with a second to hopefully be funded by mid-year.

### **Conclusion**

WEPAN is leading an effort to meet the need for readily accessible information and communication about women in engineering. Supported by a National Science Foundation Engineering Education and Centers (EEC) grant (#0648210) and launched in April 2009, the WEPAN digital Women in Engineering Knowledge Center focuses on informing research, practice and institutional change related to women in engineering. In addition to serving as a digital collection of resources, reports, information, data, best practices, and profiles of organizations focused on issues related to women in engineering, the Knowledge Center serves 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. Usage to date has been strong and opportunities for collaboration continue to arise. All of these help disseminate the resources on women in engineering, as well as the existence of the Knowledge Center itself, along with the capacity of the professional community for connecting the larger women in engineering community. The ongoing work of the Knowledge Center should provide unique opportunities that have the capability to effect institutional change related to women in engineering.

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