National Girls Collaborative Project

The National Girls Collaborative Project (NGCP) brings together organizations that are committed to informing and encouraging girls to pursue careers in science, technology, engineering, and mathematics (STEM).

www.ngcproject.org

Regional Collaboratives
California www.ngcproject.org/california
Florida www.ngcproject.org/florida
North Carolina www.ngcproject.org/northcarolina
Northwest www.ngcproject.org/northwest
Project Goals

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

2. Strengthen capacity of existing and evolving projects by sharing promising practice research and program models, outcomes and products.

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

The NGCP will disseminate Research Based Strategies to strengthen the capacity of girl-serving organizations to provide high-quality informal learning environments for girls in STEM and to effectively evaluate and assess their efforts.

Our partners
- Education Development Center (EDC)
- Assessing Women and Men in Engineering (AWE)

Our methods
- Webcasts
- Collaborative events
- Resource collection on NGCP website
Good Assessment = Success: Developing Assessment Based Outreach

Barbara Bogue, M. Sc.
Assoc. Professor Engineering Science & Mechanics and Women in Engineering
Penn State University

Rose Marra, Ph.D.
Assoc. Professor, Learning Technologies
University of Missouri-Columbia

NGCP Webcast
12 September
2007
Introducing … Barbara Bogue

- PI, NSF AWE-PSU & SWE-AWE; Co-PI, AWISE.
- Associate Professor of Engineering Science & Mechanics & Women in Engineering, Penn State.
- Formerly director of Penn State Women in Engineering Program
Introducing … Rose Marra

- PI of NSF AWE & AWISE.
- Associate Professor of Learning Technologies, University of Missouri.
- Formerly director of Engineering Instructional Services, PSU and software engineering, AT&T Bell Laboratories.
Good Assessment=Success

Agenda

- Why Assess?
- Using Assessment as Tool for Planning & Implementing Assessment/Evaluation
- Using Results
- Assess with Limited Resources
- Access AWE resources.
A Case: They Designed a Better Program through Assessment

- Recruiting girls to engineering
  - Residential → Day Camp
  - Resource Intensive → Lean
Results: Apparently Successful – But Maybe Not?

Pre and Immediate Post Survey Results

- Introduce girls to engineering career
  - Pre: 40/42 no interest in engineering
  - Post: 42/42 indicate interest in pursuing engineering as career

- Recruit girls
  - 13/15 seniors plan to apply to Penn State

- Provide leadership opportunities
  - 6/6 leaders give experience high marks (immediately and 6 mo. Post)
But Maybe Not…
Other Metrics: Resource Investment

**Longer term tracking**
- Recruit girls
  - 2/15 seniors apply
- Retain currently enrolled women
  - Tracking indicates all leaders are retained

**Costly**
- ~$1500/girl
- Staff and leadership in full use for week; worn out
- Cost/recruitment yield=full tuition instate scholarship for one year!

**Ratio of leaders/presenters to participants low**
- Few upper-level women got leadership experience

**Time**
- Over 50% of time spent eating and sleeping!
- Only 10% on actual engineering activities!
What is Assessment?

And why do it?
Getting Started: Assessment-Based Program/Activity Development

1. Identify Need or Hypothesis
2. Define Goal/Desired Outcomes
3. Develop Activity to Achieve Goal
4. Develop Measurable Objectives For Activity Based Upon Goal/Outcomes
5. Develop/Find & Implement Assessment Based Upon Testing of Objectives
6. Use Assessment Results to Evaluate/Improve/Justify Activity, Adjust Objectives or Test Hypothesis
7. Continue or Discontinue Activity

- Review literature, best practices, prior experience, existing programs
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Portrait of Poor (but typical) Assessment

Danger: Closed Feedback Loop

Asks leads to Typical Happy Face Survey

Did you enjoy this activity?

Yes, but...

Talks are boring; I like action

Improvements in delivery of activity

MIA: Information on whether objectives of activity have been met
Types of Assessment Data

- Emphasis on quantitative assessment
  - Quant. methods can be resource smart
  - Easier to handle, report data for small teams
    - Allows both fast and complex analysis as well
    - Questions raised can be pursued with qualitative methods such as focus groups
  - Qualitative assessment is very effective, but quite resource intensive

- Summative and Formative assessment
  - Important to use both in instruments
    - Summative: Big picture questions, overall impact
    - Formative: Easily understood results that feed into continuous improvement of activity
Define Goals and Objectives – Foundation of Outreach Activities

- Goals define our **broad** aim for the activity.
- Objectives support the goal and operationalize
  - Inform planning
  - Lead to measurable outcomes.

**Goal: Recruit more women into engineering.**
Goals and Objectives – Why do they matter?

- Planning Tool
  - ID what we want to know before we design/implement activity
- Focus activity planning on the participant
- Maintain focus on desired outcomes during implementation
  - Ask: Does it address the objectives?
- Focus the assessment
  - On measuring the stated objectives
Good Objectives . . .

- Align with and support goal
- Specify outcome measures
- Recruitment camp example objectives
  - Promote interest in engineering for girls who have not expressed / shown this interest
    - As measured by pre- and post- survey responses
  - Recruit girls to engineering at Penn State
    - As measured by survey and admissions data
  - Provide leadership training and retain upper-level engineering student women
    - As measured by survey and tracking for retention
## What Counts as Measurable Evidence?

<table>
<thead>
<tr>
<th>Objective</th>
<th>Acceptable (aligned) Measures</th>
<th>Assessment Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest girls in studying engineering</td>
<td>Girls who attend camp EXPRESS interest in studying engineering</td>
<td>Post surveys, interviews or focus groups with girls – that address future plans &amp; interest.</td>
</tr>
<tr>
<td>Recruit girls into engineering at PSU</td>
<td>Girls who attend camp enroll in engineering at PSU</td>
<td>Track enrollment of girl participants into engineering at PSU</td>
</tr>
<tr>
<td>Retain upper level women</td>
<td>Women who serve as camp leaders are retained in engineering</td>
<td>Track retention in engineering of women camp leaders</td>
</tr>
</tbody>
</table>
The Common Theme

Alignment

Broad Goal

Supporting Objectives

Alignment

Evidence

Alignment

Measures

To implement successful programs ALWAYS Align goal, objectives, evidence and measures
Final Step: Use Assessment Results!

- Analyze
- Report
- Revise
What Conclusions Can You Draw from Your Data?

- Describe patterns to explain what happened
- Compare results to measure impact

For data collection after activities, use frequent reminders to minimize bias from non-response
Let’s Go Back to… That Engineering Camp

Decisions based upon assessment data related to goal and objectives:

- Moved from residential damp to day modules
  - Students can attend 1 to 5 days
  - Focus on different interdisciplinary topic each day
- Result: More focus/concentration on objectives
  - Serves more girls & women
    - Residential Camp=60 max
    - Day modules=300+
  - Increases Leadership Opportunities
    - Residential=10 leaders
    - Day Modules=60+ leaders
  - Eliminates large investment in logistics, eating, sleeping
  - Lowers Cost per girl: $1500 to $142

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Revise, Continue, or Discontinue Based on High Quality Evidence

MTM: Anatomy of a Program Change Based on Assessment & Time/Cost Analysis

Barbara Bogue
Director, Women in Engineering
Penn State

Continue or Discontinue Activity
Wait! What About the Sponsors?

- Use data/outcomes to explain why you are making changes
- Back to camp example:
  - Explained to primary sponsor why the camp needed revision
    - Cited assessment results
  - Sponsor increased support
    - Impressed with process
    - Confidence rose in ability to reach stated outcomes
  - Used story in proposals to attract more funding
Report Your Results

● Disseminate widely
  - Program stakeholders including sponsors and *internal audiences*
  - Colleagues and researchers
  - NGCP, NCWIT and other organizations

● Keep in mind
  - Publication requires IRB approval
  - Confidentiality must be maintained
  - Even “non favorable” data can be useful

Remember: Even “Bad” data can be GOOD data! All data provide information needed to make sure you achieve objectives
Assessment – Can be Challenging..

Assessing with limited resources:

- Time
- People
- $$$
Assessment Challenges

- Supporting good assessment requires time and money
- Decide what is “worth assessing”
  - Prioritize
    - Decide what level of assessment to do on each activity
- Gather the “right” data
  - Create and test measurable objectives
  - Avoid temptation of “over assessment”
- Analyze, understand and use data

 ✓ Save “deep” assessment efforts for highly resourced, high visibility activities
 ✓ Collect only data/information that you need and will use
Leverage Resources . . .

- Use what you have at hand
- Identify & use existing instruments
  - First evaluate:
    - Do they match your objectives?
    - Fit level of assessment needed?
    - Been tested for reliability and validity?
- Use AWEonline.org tools
- Set up relationship with university unit or partner who can do complex analysis
Using & Adapting AWE Tools To Stretch Your Budget

- **AWE surveys:**
  - Online and in paper format
  - Customizable to your institution, organization or activity

- **Access tools to support assessment**
  - IRB tips, etc.
  - AWE Research Overviews and Annotated Bibliography
New Things Happening at AWE

- SWE-AWE!
  - AWE is moving to SWE this fall
    - NSF GSE Grant
- Launch of ADAPT
  - the AWE Database for Participant and Activity Tracking
AWE ADAPT

Welcome to ADAPT—The AWE Database for Activity and Participant Tracking

The online tool that organizes, stores and retrieves your participant related engineering activities and participant records.

ADAPT allows you to:
- Document activities, participants, volunteers and sponsors
- Retrieve information quickly and easily
  - Mailing lists
  - Reports for Sponsors
  - Overall demographic reports
- Create Online Participant Registration for activities

Program Coordinators, Administrators - register or logon from above.

Upcoming Activities in Various Institutions

Total: 1

6/30/2007 to 9/30/2007, Pennsylvania State University, PA
Pre-First Year in Engineering & Science Summer Program (PREF)
What were the highlights?

- Use assessment to drive planning
- Align, align, align
- Use your data
- Leverage resources

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Learn More / Contact Us

- www.AWEonline.org
  - Free registration provides access to all tools
  - AWE news featured on NGCP E-Newsletter
  - Watch for new product announcements and the launch of SWE-AWE

- Contact us …
  - R. Marra (rmarra@missouri.edu)
  - B. Bogue (bbogue@psu.edu)
Additional NGCP Information

Program Directory
www.pugetsoundcenter.org/ngcp/directory/index.cfm

Join the NGCP listserv
www.pugetsoundcenter.org/ngcp/resources/newsletter.html

Upcoming Webcasts
• Tools for Collaboration Success: NGCP Mini-Grants
  Wednesday, October 10, 2007 11:00-12:00 Pacific DST
• Informal Learning – Promising practices with girls in STEM
  Date TBA – November 2007