How Well Are We Serving our Female Students in STEM?

May 16, 2012

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Introductions

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Evaluation Resource Center for advanced technological education

www.eval-u-ate.org
Objectives

By the end of this webinar, you will learn...

1) Why gathering gender data is critical
2) The nuts and bolts of collecting enrollment/retention data
3) How to assess the effectiveness of strategies to improve the recruitment and retention of women in STEM programs
4) How to use data to leverage change

Handout

Available from www.evalu-ate.org/resources
Keyword search: female
How Well Are We Serving Our Female Students in STEM?

www.evaluate.org

Women in ATE
Lori Wingate

“NSF is committed to broadening participation.”

www.evalu-ate.org
women, minorities, and persons with disabilities

Broader Impacts Criterion

“How well does the proposed activity broaden the participation of under-represented groups?”
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Results from Prior NSF Support

Describe specific outcomes and results

Lori

Results from Prior NSF Support

Demonstrate impact

Lori
Results from Prior NSF Support

Provide
evidence
of quality and
effectiveness

Results from Prior NSF Support

Accomplishments
related to
broader
impacts and
results
2012 ATE Survey Results

230 (92%) of ATE PIs completed the 2012 survey

120 (52%) reported supporting a degree or certificate program with their grants

109 (91%) reported gender data

~ 1 in 5 ATE students is female
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Representation of Women Across ATE Disciplines

- Total: 14,839 (22%)
- Biotechnology: 763 (56%)
- Geospatial technologies: 281 (42%)
- Information and communications: 3,527 (35%)
- Electronics and controls: 378 (33%)
- Security, information assurance and...: 1,529 (24%)
- Micro and nanotechnologies: 79 (22%)
- Chemical processes: 69 (22%)
- Agricultural and natural resources: 119 (22%)
- Energy use (or conservation): 75 (20%)
- Technology teacher preparation: 10 (18%)
- General manufacturing: 4,891 (16%)
- Energy production: 312 (12%)
- Automotive manufacturing: 389 (12%)
- Marine technologies: 41 (11%)

Women in ATE: 2006-11

- All 2-Year Colleges*: 59% to 57%
- ATE Program: 31% to 22%

* Source: National Center for Education Statistics
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ATE v. National Rates: Representation of Women in 3 Disciplines

- Information and Communications Technologies:
  - All 2-Year Colleges: 36%
  - ATE-Supported Programs: 43%
- Engineering Technologies:
  - All 2-Year Colleges: 13%
  - ATE-Supported Programs: 23%
- Agriculture and Natural Resources:
  - All 2-Year Colleges: 26%
  - ATE-Supported Programs: 31%

* Source: National Center for Education Statistics

Digest of Education Statistics 2010

Data from K-16 institutions
- Enrollments
- Degrees awarded
- Programs
- Student demographics
- Faculty demographics

www.evalu-ate.org
Female Participation in ATE-Funded Programs: A Ten-Year Trend

Assessing Women and Men in Engineering (AWE) Project:
- surveys
- literature reviews
- participant tracking tool
- webinars

Lori
How Well Are We Serving Our Female Students in STEM?  

Why Gathering Gender-Segregated Data is Critical

Enrollment Data Example

City College of San Francisco Female Enrollment in Introductory Computer Networking & IT Courses

- Baseline 2006-07
- Spring 2008
- Fall 2008
- Spring 2009
- Fall 2009
- Spring 2010
- Fall 2010
- Spring 2011

% Female Enrolled

© Institute for Women in Trades, Technology & Science
Retention Data Example

City College of San Francisco Female & Male Completion Rates for All Courses

Retention Rates

Compare
- female and male retention rates
- changes in female and male retention rates
Hard Data vs. Anecdotal Evidence

- Impressions often skewed when it comes to groups with minority status
- Impression is there are larger #s from the minority group than are actual
- Stories and “lore” are the norm

CCSF online training:

Good example of why data should inform rather than impressions
Feedback Loop

- For administrators and instructors
- Assess effectiveness of intervention; what is/is not working
- Positive validation for those schools

The Nuts and Bolts of Data Collection

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How Well Are We Serving Our Female Students in STEM?

<table>
<thead>
<tr>
<th>Term</th>
<th>Course</th>
<th>Enrollment</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td># total students</td>
<td># females</td>
</tr>
<tr>
<td>Average Baseline Sp06 F06 Sp07 F08</td>
<td>SAMPLE</td>
<td>40.5</td>
<td>7.6</td>
</tr>
<tr>
<td>Spring 2008</td>
<td>CNT 103</td>
<td>48.2</td>
<td>23.4</td>
</tr>
<tr>
<td>Fall 2008</td>
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<tr>
<td>Fall 2009</td>
<td>CNT 103</td>
<td>48.2</td>
<td>23.4</td>
</tr>
<tr>
<td>Average Sp 08 to Current</td>
<td>CNT 103</td>
<td>48.2</td>
<td>23.4</td>
</tr>
</tbody>
</table>

SAMPLE No Introductory Courses offered Summer 2008, Summer 2009

Data Collection Spreadsheet

- Intro vs. advanced courses
- Formulas are averages and percentages
- Limitations:
  - No total “N” of women
  - Low numbers skew percentages
Obtain the Data

Commitment letters from
- College President
- STEM Department Chair

Baseline data required in proposal

Assessing Strategies for Improving Female Recruitment and Retention

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## CalWomenTech Survey of Female Technology Students (N=60)

<table>
<thead>
<tr>
<th>Retention Activity/Strategy</th>
<th>Have Experienced</th>
<th>Have Not Experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rated Helpful or Very Helpful</td>
<td>Rated Not helpful</td>
</tr>
<tr>
<td>Learned basic skills needed for the course during the first few weeks of a course</td>
<td>100.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Instructor demonstrated or modeled before we did lab activities</td>
<td>98.1%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Was taught modules or small sections of instruction focused on one aspect of a course</td>
<td>97.4%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Used software to help me with problem-solving</td>
<td>97.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Helped with tool identification and use</td>
<td>96.9%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Participated equally with males during hands-on activities</td>
<td>95.7%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Taught the process of problem-solving</td>
<td>93.8%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

## CalWomenTech Survey of Female Technology Students

Overall, how would you describe the classroom environment in your technology courses?

- **Very positive**: 73%
- **Slightly positive**: 14%
- **Neutral**: 14%
- **Slightly negative**: 0%
- **Very negative**: 0%
CalWomenTech Survey of Female Technology Students

Have you ever had a negative experience in a technology class?

- **No**: 78%
- **Yes**: 22%

CalWomenTech Survey of Female Technology Students

Would you recommend another female enroll in your technology-related course or program?

- **Yes**: 100%
- **No**: 0%
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CalWomenTech Survey of Female Technology Students

**Age of respondents**

- 18-21 years: 22%
- 22-25 years: 13%
- 26-30 years: 17%
- 31-40 years: 20%
- 41-50 years: 18%
- 51+ years: 10%

**Ethnicity of respondents**

- Caucasian/European American: 32%
- Latina/Hispanic: 25%
- Multi-racial: 17%
- Asian or Pacific American: 14%
- Black/African American: 5%
- American Indian/Alaska Native: 3%
- Other: 3%

Respondents’ work situations: **Number of hours worked per week**

- 40+: 32%
- 31-40: 13%
- 21-30: 17%
- 11-20: 13%
- Less than 10: 3%
- Not working: 20%

Respondents’ family situations

- Single, no children: 48%
- Married/partner with children: 22%
- Married/partner no children: 15%
- Single parent: 15%
CalWomenTech Survey of Female Technology Students

Top 3 Recruitment Strategies

- “Heard about the technology program from an instructor” 46%
- “CalWomenTech Role Model Posters” 40%
- “Heard about the technology program from a counselor or advisor” 29%

Leveraging Change with Data

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Data for Change

- Baseline data sound alarm bell
- Generate interest in building a team for change
- Progress reports on outcomes, not just process, kept the focus on outcomes

Patterns in data can reveal strengths and weaknesses in the system
Data for Change

Outside technical assistance provider can help with the delivery of less-than-favorable results

- In the case of CCSF data presented to all instructors who helped developed plan to increase retention

- Check-ins with coaching and report on data collection
Data for Change

Ultimately, CCSF’s data validated their strategies and allowed them to be featured by IWITTS, NSF, CCSF and be celebrated.

WomenTech Educators Training

National Training
More Female Students in Just One Year System
June 21-22, 2012
San Francisco Bay Area

Online Training
September 10-November 16, 2012
Your Office!

Learn more and register at
www.iwitts.org/training
How Well Are We Serving Our Female Students in STEM? 5/16/2012

WomenTech Educators Training: NSF-ATE
Includes long-term support for implementation

BATEC
July 9-10, 2012, UMass Boston
Apply by May 24, 2012
www.surveymonkey.com/s/KLNW7NK

MPICT and CCC-ICT Collaborative
June 25-29, 2012, Ohlone College in Fremont, CA
Faculty Development Week for qualified community college instructors in ICT related programs
www.mpict.org/

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With Evaluation and Logic Models

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