Retain Students
An NCWIT Empower Hours Workshop

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Some of your students will...

- **STAY** no matter what you do
- **LEAVE** no matter what you do
- allow you to **INFLUENCE THEIR DECISIONS** to stay or leave
Agenda

1:45-2:45
   » Strategies and NCWIT Resources
   » The Power of Data

2:45-3:45
   » Discussing Your Plans for Retention
   » NCWIT Programs and Campaigns
Retention Research & Strategies
NCWIT Retention Resources

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Understanding Girls’/Women’s Experiences in Computing Classes

» Less programming experience, perceptions that others are better prepared
» Gendered reaction to grades, loss of self-efficacy
» Topics embedded in assignments and examples more relevant to males’ interests
» Standing out as different, yet isolated; constantly confronting negative stereotypes
» Femininity as a double bind
» Limited sense of belonging
» Limited opportunities to develop peer relationships

Attrition of Girls/Women

Research: More Personally Meaningful, Greater Persistence

» Women more likely to take additional courses when assignments are more personally meaningful.

» Meaningful and relevant assignments, examples, explanations predict intention to complete computer science major.

Barker, et al. 2014; Guzdial, 2014
Retention increased when faculty:
» Perceived as caring about teaching, course content
» Have authentic concern for students
» Are accessible beyond the classroom
» Encourage students

Retention predicted by support from peers

Astin and Astin 1992; Barker, et al. (2014); Cohoon 2001; Cohoon, Cohoon, and Turner 2007; Cotten & Wilson, 2006; Felder 1995; Fox 2001; Hearn and Olzak 1981; Seymour and Hewitt 1997; Vogt 2008
Research: Collaborative Learning Associated with Retention

- Higher test scores and learning gains
- Greater sense of academic community, belonging
- Quality interaction with professors and peers
- Student involvement
- Enthusiasm

Questions on Retention Research?

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Change the System, Not the Student

- Retain with Pedagogy
- Assess Your Efforts
- Support Your Initiatives
- Retain with Curriculum
- Retain with Student Support

Recruit Strategically
Retain by Making It Meaningful

» Connect concepts to later choices (major, graduate school, career)

» Use examples, assignments, explanations relevant to students’ life goals and interests (can survey students)

» Course themes, tracks

» Include a true introduction, bridge courses

» Early hands-on design projects
Retain by Promoting Community, Peer Support, Belonging, and Shared Identity

- Collaborative learning approaches in class
- Inclusive, comfortable climate in class
- Set rules for professionalism
- Shared learning in lab, discussions
- Introduce graduate students into scholarly community
Many Collaborative Learning Techniques

» Peer instruction
» Small group problem solving in class
» Peer-led team learning
» Pair programming
» “Flipped” classroom
» Office in lab, with other grads and post-docs
Retain with Faculty-Student/TA-Student Interaction

- Train teaching assistants and lab tutors
- Encourage students and use “growth mindset”: emphasize practice
- Give timely feedback about what grades mean
- Intentional role modeling
- REUs
- “Champion” of graduate students
Retaining undergraduate CS students with engaging open curriculum resources for intro CS courses.
The Power of Data: Tools for Assessment

ncwit.org
Collect Data to Track Results

- Assess process and goal attainment
- Report results
- Revise
- Continue/Discontinue
Student Experience of the Major (SEM) Survey

The SEM Survey assesses students’ academic and social experiences shown to predict retention. The survey can be administered in its entirety or as individual modules that represent the 10 dimensions of student experience in the major.

» Classroom Climate
» Collaborative Learning
» Faculty-Student Interaction
» Student-Student Interaction
» Students’ Perception of Assignments and Tests
» Pace and Workload Level
» Student-Teaching Assistant Interaction
» Perceived Sexism and Racism in Classes
» Students’ Commitment to the Major
» Overall Satisfaction
Generic B University—Computer Science

![Generic B University—Computer Science](chart.png)

**CUSTOMIZE CHART DATA**

**Data Sets**
- Applicants
- Acceptances
- New Enrollments
- Attrition Rates
- Graduating Trends
- Total Declared Majors

**Gender**
- Female
- Male

**Races/Ethnicities**
- All Races/Ethnicities
- Underrepresented Populations
Comparisons with national data (IPEDS, Taulbee)

Generic B University-Computer Science

The years listed refer to the start of the academic year, (i.e. 2004 refers to the 2004-2005 academic year)

Graduating Trends Female
IPEDS (11.07)  Computer Science Graduating Trends Female
Taulbee Graduating Trends Female
### Why are you taking this course?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Bar</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Required for a major in Computer Science</td>
<td></td>
<td>114</td>
<td>52.78%</td>
</tr>
<tr>
<td>2</td>
<td>Required for another major or degree (please list)</td>
<td></td>
<td>85</td>
<td>39.35%</td>
</tr>
<tr>
<td>3</td>
<td>Elective</td>
<td></td>
<td>1</td>
<td>0.46%</td>
</tr>
<tr>
<td>4</td>
<td>Interested in Computer Science</td>
<td></td>
<td>12</td>
<td>5.56%</td>
</tr>
<tr>
<td>5</td>
<td>Think the course will be helpful</td>
<td></td>
<td>1</td>
<td>0.46%</td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td></td>
<td>3</td>
<td>1.39%</td>
</tr>
</tbody>
</table>
What Topic Would You Like to Discuss?
Go Sit by Flip Charts
Discussion at Tables
What’s next?

- Visit www.ncwit.org/ncwit2go for easy to use resource collections designed to help you achieve your goals.
<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Aspirations in Computing</td>
<td>Aspirations in Computing is a sweeping national talent development initiative for young women in computing and information technology from kindergarten through graduate school.</td>
</tr>
<tr>
<td>Pacesetters</td>
<td>Pacesetters is a unique fast-track program where company and university leaders work together to increase their organization’s number of technical women.</td>
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<tr>
<td>Extension Services Client Showcase</td>
<td>Extension Services provides customized consultation to computing and engineering undergraduate departments to help them develop high-impact strategies for recruiting and retaining more women students.</td>
</tr>
<tr>
<td>EngageCSEdu</td>
<td>EngageCSEdu is a collection of CS1 and CS2 materials that support the retention of women and other underrepresented groups in undergraduate computing education.</td>
</tr>
<tr>
<td>Sit With Me</td>
<td>Sit With Me invites you to validate and recognize the important role women play in creating future technology.</td>
</tr>
<tr>
<td>Male Advocacy</td>
<td>Learn more about the importance of male advocacy and the most effective ways men can advocate for more inclusive organizational cultures. This session is focused on industry but others are welcome to attend!!</td>
</tr>
<tr>
<td>Tapestry and C4C</td>
<td>Tapestry workshops prepare high school computer science teachers to attract and retain more—and more diverse—students to computing. C4C equips school counselors with information and resources they can use to guide toward education and careers in computing.</td>
</tr>
<tr>
<td>Latinas in Technology</td>
<td>Latinas in Technology is a campaign that brings together policy makers and leaders from education and industry to encourage Latinas and their families to consider careers in technology.</td>
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