Tools for Recruiting & Retaining Diverse Students in IT
The National Center for Women & Information Technology (NCWIT) Approach
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An EXERCISE

Who are you?

Quickly generate a list of single words that describe you

Respond at PollEv.com/bethquinn222

Text BETHQUINN222 to 37607 once to join, then text your message

BTW: It’s anonymous!

If you want to use multiple word answers, use an “_” between words
What you’ll have when you leave this session

- An understanding of what NCWIT is and how it can help your team
- Some statistics you can use when thinking & talking about these issues
- A few good ideas to think with (social science, anyone?)
- Actionable ideas & resources to use in your courses and programs
An organization of "member organizations"
Community Colleges, like all non-profit academic institutions, join NCWIT for free

NCWIT is funded through grants from the National Science Foundation (NSF), through corporate gifts, and through corporate membership fees.

YES – your departments should join! It’s easy—and worth it.
Why does NCWIT exist?
Technology is changing our world.

Technology careers are lucrative and computing skills are in demand.

Diversity in computing is lacking.

Women, especially women of color, are essentially “absent” from technology innovation.

Change leadership is critical.

Ineffective strategic leadership allows underrepresentation in computing to persist.

By 2024, **1.1 million computing-related job openings** are expected. At the current rate, only **41% of these jobs could be filled** by U.S. computing bachelor’s degree recipients.

In 2015, **25% of the computing workforce were women**, and **less than 10%** were women of color. (5% were Asian, 3% were African-American, and **1%** were Hispanic.)

Isolated efforts are not enough for sustained change. **Organizations must take a comprehensive, systemic approach** in order to increase gender diversity.
Women are underrepresented in CIT jobs

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<tr>
<td><strong>57</strong></td>
<td>Percent of all professional occupations in the 2014 US workforce held by women</td>
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<td><strong>25</strong></td>
<td>Percent of professional computing occupations in the 2015 US workforce held by women</td>
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<td><strong>6</strong></td>
<td>Percent of corporate Chief Information Officer (CIO) positions held by women in 2014</td>
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The number of CIS degrees is on the rise (again)

Source: The Integrated Postsecondary Education Data System. US Department of Education. IES National Center for Education Statistics.

Graph shows data from 1987 to 2014.
Computing is an anomaly.
It starts early…

e.g., AP Course Taking

In 2015, girls took…

- 60% of all AP Biology
- 49% of all AP Calculus AB
- 42% of all AP Calculus BC
- 48% of all AP Chemistry
- 55% of all AP Environmental Science
- 40% of all AP Physics 1
- 52% of all AP Statistics

But girls only took…

- 22% of all AP CS A
- 32% of all AP Physics 2
- 24% of all AP Physics Electricity/Magnetism
- 27% of all AP Physics Mechanics

AP Program Participation and Performance Data 2015 (collegeboard.org)
Why diversity is important to computing

- Enhances Innovation
- Expands the Qualified Employee Pool
- Improves the Bottom Line
- Promotes Equality
To significantly increase women’s meaningful participation in computing by equipping “change leaders” (that’s YOU!) with research-based techniques for taking action in recruiting, retaining, and advancing women across the “pipeline”: K–12 to higher education, throughout industries and entrepreneurial careers.
NCWIT employs a three-pronged strategy

CONVENE

EQUIP

UNITE
Member organizations convene in “Alliances”
Members convene at our annual Summit

NEXT NCWIT SUMMIT
May 22-24 2017, Tucson, AZ
Members convene throughout the year...

- At “Pacesetters” meetings and calls
- As Extension Services Clients
- On special committees, e.g., the Male Advocacy working group
- As supporters of NCWIT Aspirations programs across the country
- As chairs of Alliances
- On advisory boards to NCWIT programs, e.g., NSF-funded EngageIT project
- . . .
NCWIT employs a three-pronged strategy

CONVENE  EQUIP  UNITE
Research scientists create evidence-based resources

RESEARCH

ACTIONABLE STRATEGIES

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ncwit.org
NCWIT Resources

https://www.ncwit.org/resources
Check out the NCWIT resources at your table
As a grassroots organization, NCWIT also provides action platforms that involve NCWIT members in creating national change efficiently and quickly.
QUESTIONS?
WHAT TO DO

STEP 1: STAND UP.

STEP 2: Introduce yourself to one other person. Name, position, institution...the usual

STEP 3: Go through the list of questions (to be revealed!) until you find something that you have IN COMMON. Talk a little about WHY you answered the way you did.

STEP 4: Stay with your partner but keep adding people to your group until you’ve found something that you ALL have in common.

SOME QUESTIONS

● “Go-to” drink in the morning: coffee, tea, soda/pop, other

● Favorite pet: cats, dogs, other, or none

● Favorite season: summer, fall, winter, spring

● Phone: iPhone, Android, flip-phone, other

MAKE UP NEW QUESTIONS if you have to!

The goal is to find COMMON GROUND!
E YOU? Quickly generate a list of SINGLE WORDS describe you.
Unpacking the exercise

➢ Why might it be important to “find common ground?”
➢ How would this exercise work with students? What might it do for them?
➢ What kinds of questions wouldn’t work, i.e., wouldn’t build “common ground”?

What can these kind of exercises accomplish?

BUILD STUDENT COMMUNITY
This is a part of a set of actions faculty can take to build and retain a diverse student body.

To engage ALL students:
- Create welcoming physical spaces
- Encourage professional behavior
- Discourage gender, racial, and other social stereotypes
- Employ well-structured collaborative learning
- Group students by level of experience with computing

Grow Positive Student Community

- Provide informal opportunities for students to interact (especially WITHIN the classroom)
- Create welcoming physical spaces
- Avoid and discourage gender, racial, and other social stereotypes
- Encourage professional behavior
- Employ well-structured collaborative learning
- Group students by level of experience in computing

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Some useful conceptual tools from the social sciences

Ideas to think (and plan) with
**Personal Identity** = how you think of yourself as unique or as an individual

**Social Identity** = how you are recognized or “known” by others.

Identities can be lifelong/fleeting, core/peripheral, wanted/unwanted.

In the work we’re doing here, we’re interested in social identities.
A schema is a mental structure we use to organize and simplify our knowledge of the world around us.

As simplified mental structures they are, by definition, a kind of stereotype.

They are socially held.

Even if you don’t believe the stereotype, you often have the cultural knowledge of what the stereotype is.
When are stereotypes around identities BAD?

When identities are:

• Are used to over-generalize and mischaracterize

AND ESPECIALLY WHEN THEY:

• Are hierarchical (better, worse), i.e., come with real privileges and disadvantages for things that are unearned

• Identities—even those we don’t actively choose for ourselves--can impact how we feel about ourselves, our aspirations, our reactions.

• The salience of identities change with context.
  • Examples…
  • What about in a CS class of mainly white and Asian men? How do race and gender become salient?

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But social science says women & men are different, right?

The Ecological Fallacy
BIAS

1) Overt, 2) Implicit, 3) Institutional
 Implicit Bias Example 1
Orchestra auditions

Traditionally? Face-to-face
Now? BEHIND A CURTAIN
Why?
When behind a curtain (no gender cues available):

• Women’s probability of advancing out of preliminary rounds increased by 50%
• Increased the percentage of new orchestral hires that were women between 25-46%.

Swedish Medical Research Council review of post-doctoral fellowship applications:

Women needed to produce more than 99 “impact factors” to be judged as competent as men who had only 20 impact factors.

**Identical resume evaluation: Case #1**

**Participants:** 238 academic psychologists, ~50/50 male/female

Male applicant received better evaluations and was more likely to be hired than the female applicant.

Identical resume evaluation: Case #2

Participants: Human resource managers who had placed ads (including those designated “equal opportunity employers”).

White-sounding names triggered 50% more requests for interviews.

WOW, YOU
SUCK AT MATH.

\[ \int x^2 = \pi \]

Source: [www.xkcd.org](http://www.xkcd.org)
Behavior Interpreted Through Stereotypes

CONFIRMATION BIAS
the tendency to interpret new evidence as confirmation of one's existing beliefs or theories.

Riegle-Crumb & King, 2010; Trusty, 2002

Source: www.xkcd.org
The Subtle Effects on Those Who Are Stereotyped

“Stereotype Threat”

Fear of confirming negative beliefs about my group...

- Leads to harsh personal standards, opting out if not met
- Hinders performance
- Affects choices and aspirations
- Masks ability

Stereotype threat

- "No gender difference has been found on this test"
- "Test usually produces a gender difference"

-- Spencer, Steele & Quinn, "Stereotype threat and women's math performance (1999)"

Women

Men
A recipe for evoking stereotype threat

A negative cultural stereotype about a group (you may not “believe it” but you know of it)

Decreased performance

A context that reminds you of your membership in that group
A “Fixed Mindset” Amplifies the Impact of Stereotypes

“Fixed mindset:” You either have it or you don’t. You are born with it. “A natural!”

“Growth mindset:” intelligence and knowledge are developed

» Work hard, effort is key to learning.
» Learn from mistakes.
» Effort praise not ability:
  “Wow, you must have tried really hard.”

“Being a top scholar in [field] requires a special aptitude that just can't be taught”
“When it comes to [field] the most important factors for success are motivation and sustained effort; raw ability is secondary”

Leslie, Cimpian, Meyer, & Freeland, 2015
Our current **cultural stereotypes** imply that

1) computing ability is innate, *fixed*,

&

2) women just don’t have it

Or

they mysteriously just aren’t (or shouldn’t be) interested because they are girls/women.
TIE IT ALL TOGETHER

Why are Girls & Women Less Likely to Pursue CS?

**Perceptions of Occupations**
- It’s “Male”
- “Engineers don’t care” community, society, lives
- “Fix things” “not creative” Work alone

**Gendering**
- High standards and proving they are “good enough”
- Self-efficacy
- Career expectations: contributing to society

**Unconscious Bias**
- Unconscious beliefs about who belongs
- Micro-inequities (intended and unintended)
- Stereotype threats
So What Can YOU Do?
Student Support Programs can be:
- Resource intensive
- Not easily scalable
- May stigmatize & exclude!

They may be necessary NOW but think of them as stop-gaps and temporary.

#1. Because the individual student has “deficiencies,”
math, spatial reasoning, study skills, connections

#2. Because the context is not good,
you provide “life boats,”
e.g., women’s groups,
women’s teas, stereotype threat training
For more long lasting, scalable changes

3 “Engagement Principles”

Grow Positive (and inclusive) Student Community

Make It Matter

Build Student Confidence & Professional Identity
Build Positive Student Community
Build Positive Student Community

Avoid Stereotypes. . .even well-intentioned

Use Well-Structured Collaborative Learning
- Pair programming
- POGIL
- Peer-learning

Encourage Student Interaction
- Ice-breakers
- Inclusive events
Make it Matter

- Employ Meaningful and Relevant Content
- Make Interdisciplinary Connections to CS
- Address Misconceptions About the Field of CS
- Incorporate Student Choice
Build Student Confidence & Professional Identity

- Mitigate Stereotype Threat
- Give Effective Encouragement
- Provide Opportunities for Interactions with Faculty
- Offer Student-Centered Assessment
To find out HOW to do this & more…

check out the “Retention Planning Workbook” & the “Recruiting Planning Workbook”
Evaluation?

CHECK OUT: https://www.ncwit.org/resources/evaluation-tools

And I’m happy to work with your team tomorrow!
Find out if your school is already a member
I can do this here or you can check on our website.

If it is, you can add your name to your school’s representatives:
https://www.ncwit.org/academic-alliance-membership-form-new-individuals

If it is NOT, fill out this form:
• https://www.ncwit.org/academic-alliance-membership-form

Academic Alliance manager, Kim Kalahar, will follow-up with you.