

Addressing and Preventing Bias in Educational Technology

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The hard facts about empathy in tech product design

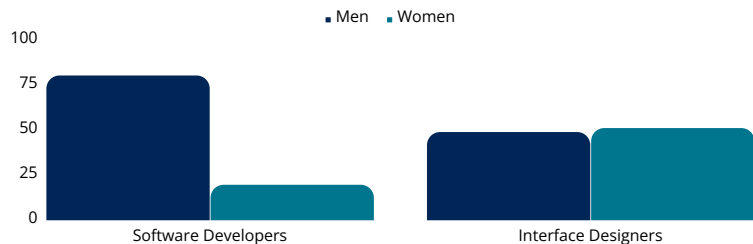
empathy

the ability to understand and
share the feelings of another

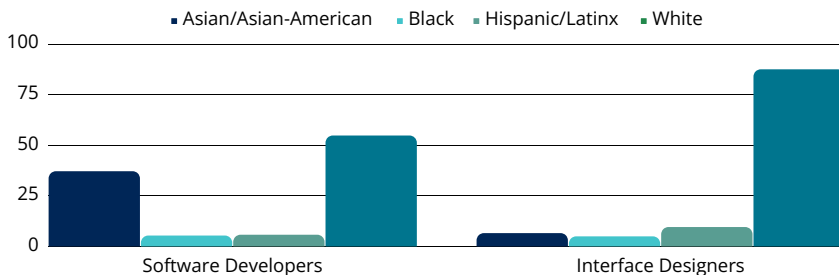


Who's designing our digital experiences?

Gender Representation Among Software Developers & UX Designers



Race/Ethnic Representation Among Software Developers & UX Designers



false consensus

the tendency for people to overestimate the extent to which our own behaviors, values, and choices represent 'the norm'



Incorporating empathy in technology design

- Where technology product decisions are made, there are often very few women, and (non-Asian) people of color
- We can't wait on talent diversification, though it is
- The people who are currently in tech product design need systematic processes, tools, and techniques that center the needs of diverse learners
- Personas can help mitigate false consensus by clarifying and centering the needs of the target audience that may not be different from the technology developers

persona

fictitious, specific, concrete
representation of a target user



Identify the characteristics beyond race and gender base that impact the problem you're attempting to solve. Then check through persona personality questionnaire to determine if there is there is a higher incidence of people from underrepresented groups represented within one or more personas.



Diversity within and among underrepresented groups

Impact of gender representation:

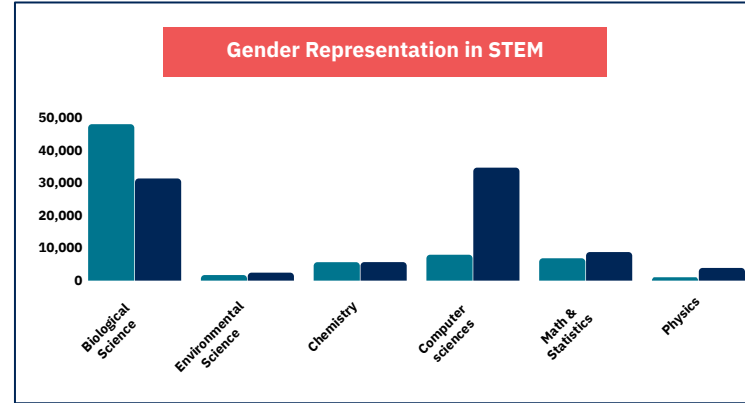
STEM teachers' gender showed no discernible impact on African American girls' retention levels in STEM studies
(Stearns, 2016)

Limiting beliefs around gender norms

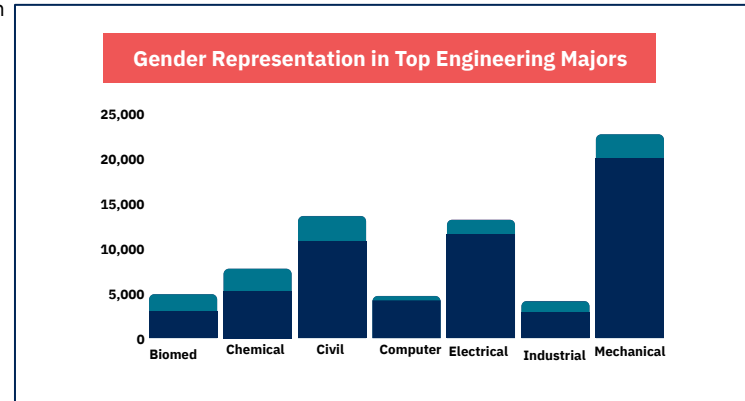
Can vary considerably by race/ethnicity, with ideas about girls' STEM capabilities being far less prevalent in certain Asian and Black communities (Hanson, 2004)

Variances in self-perception

Black women are more likely than other women in racial minority groups to desire to become mathematicians
(Duran, 1987)



● Men
● Women



Tips for creating effective personas for ed tech solutions



Identify the desired impact of the technology solution: is it engagement? Persistence? Understand the educational research of key factors that drive those results.



Conduct qualitative research using nationally-normed questions related to the area of impact you're looking to influence.



Complete multiple rounds of coding and categorization to determine the important areas of distinction for how your target audience will interact with your solution. Conduct member-checking.



Consider using gender-neutral names for your personas and alternating race/ethnicity of personas if these characteristics don't demonstrably differ in meaningful ways.



**Teaching tips for
using technology
to improve equity
outcomes in your
course**

**KIDS DON'T
LEARN FROM
PEOPLE THEY
DON'T LIKE.**

**Rita Pierson
TED Talk**



Universal Language

**Technology Connects:
Instructors
Classmates
Content**



Students don't care how much you know, until
they know how much you care.

- John C. Maxwell

Strengthen teacher-learner connections

Make it personal

- Create an introduction page for students to learn all about you; a space for students to share
- Assess students' specific learning needs

Show consideration for all learner needs

- Use technology for accessibility to include email, chat, virtual meetings, texts
- Establish a diverse and inclusive culture code where every student feels welcome
- Post within learning platform services and resources available to all students, including ADA services

Let students lead their learning

- Promote a student-led, instructor-facilitated learning environment



Connecting classmates

Create class groups to support ongoing engagement, in and outside of class

Encourage peer-to-peer group chat communication channels (i.e. GroupMe, WhatsApp)

Use technology to provide collaborative learning opportunities

Connect learning partners for continual support throughout the term



When students cannot learn the way we teach,
we have to teach the way they learn.

Stronger connections to content

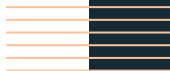
Incorporate mobile phones as learning devices

Implement multi-modal instruction through video, audio, written text, ebook, graphics, etc

Utilize video as discussion prompts

Allow for anonymous sharing

Assess students' progress and provide e-resources and feedback



Macmillan's commitment to diversity, equity, and inclusion: content and technology development

We use data and research to design products that will support instructors, students, and institutions achieve their full potential. We use a combination of **user-centered design, research from the learning sciences, and empirical insights from partnering with instructors on researching effectiveness.**



Students building with us....

McKayla-McKenzie

Sophomore at SUNY Westbury

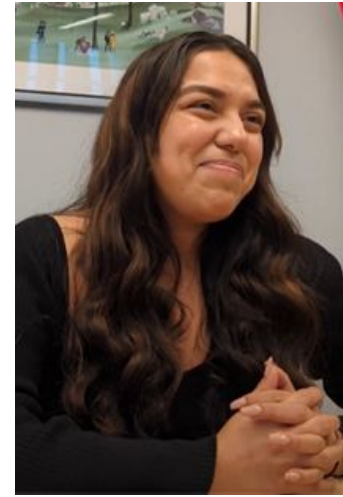
Major: Psychology

Extracurriculars: RA

Goal: Build a community of friends and make more connections

Study Habits: Tends to study late at night, wants to change this habit

Describes self: Introverted, anxious, perfectionist, funny - but only after you get to know me



Adrianna

Sophomore at CA State, San Bernardino

Major: Sociology

Extracurriculars: Works part-time, lives with cousin and helps take care of her children

Goal: Become first person in family to go to college and figure out how to handle it on low income

Study Habits: Write everything down, use a calendar to schedule study time and fit in work and caretaking

Describes self: Helpful, good time management, caretaker of her cousins

Instructors building with us....



Lisa

Psychology professor at SUNY, Old Westbury for 36 years

Approach to teaching: Create socially just classrooms where students have a role in planning the course and model the behaviors you expect to see (arrive to class on time)

Goals for her classes: Help students see instructors as human beings, get students to seek help and come to office hours, create understanding in students that it's not a racially just world and how to navigate it

Successes she has experienced with students: Helped her students improve their writing skills while taking her psychology classes, enabled and supported her students to join professional organizations in effort to help build relationships and support after college

We co-design learning solutions with instructors and students



- What are the key challenges instructors face in their courses and how can we help alleviate them?
- Where can we create efficiencies for instructors to save them time in their daily lives and in the classroom?
- What does a student's journey look like? Where are the key risk points and what can we create to reduce risk of drop-out or failure?

“

I've never been part of a review process where I've actually seen my feedback built into a tool like this - it's really cool to see

-Kiandra Johnson, Spelman College

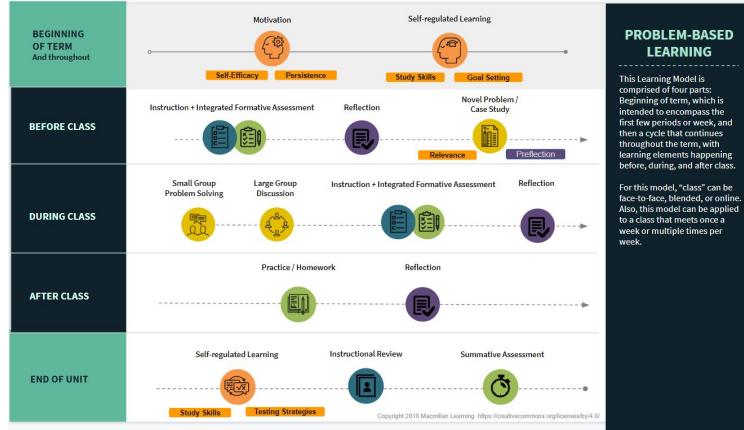
Academically	Summer before start	Week leading up to start	First 1-2 Weeks	Middle of term	Final weeks of term	After semester ends
Doing	* Hanging with friends * Networking * Reviewing textbooks * Traveling * Chauffeuring * Working * Choose a prof with office hours, interactive, engaging	* Partying * Hung out with friends * Networking with new students * Making syllabus * Textbook * Developing tests and assignments	* Cook Together * Formed friend group * Phone calls * Meeting new people	* Lots of interactive discussions * Chugging along * Talking before, during and after class * Patience * Join clubs * Work out together * Would help stop aks how doing * Losing friends * Making sure how to apply * follow-up, ask questions, body engaging * sending emails feels like care * Know come ask for help	* Work, work, work * Grading * helping students to complete work * Studying with friends * Late night eating / outings * still working very last day (time mgmt)	* Drinking good champagne * Dealing with grade concerns * reviewing textbook * Rest, sleep * reflecting on year with peers
People, Places, Things	* Friends * Advisors * all over area * video games * Contacting instructors	* Networking * Training * Friend's house * instagram * park * student organizations	* 1-1 w/ instructor on work * dorms * CAU Promenade * cosmo lounge * student organizations	* Walmart * student organizations * student discussions / grades * study groups * student center -- active while doing study * library * Gym * interactive, feel comfortable asking for help	* CFA, McDonalds * Library * waffle house	* Morehouse * Home * Party * Go to graduation * Student organizations
Thinking	* How to motivate? * how do i get a scholarship? * how can I afford this? * Who's the professor? * Where will i be going? (school work)	* How to motivate * What will my roommate be like? * What is school going to be like? * Can I pass?	* How to motivate? * I do not know what's going on here? * So many new people! * Will I stay friends with these people?	* Defeated, thinking about why in school * What should i do now? * reaching out to students not showing up * Money in it what am i doing wrong? * disengaged * outside class so much think * Thinking about spring break * Don't wait to help struggling * separation work vs school hard to separate (time mgmt, guide schedule) * need to get through gen ed, what doing for	* Should I retire? * how am I going to pass finals? * I AM SO STRESSED * are students prepared for final exam?	* I survived * So glad I am done * This kind of sucks but it's kind of fun
Feeling	* Excited * Anxious * Nervous	* Anxious * nervous * excited	* Excited * Excited	* Frustrated * concern * stress * stressed * Lost	* Frustrated * Exhausted * Overwhelmed * Tired	* Exhausted * Relief * frustrated * even doing good dressed, maintaining

Key:

- * Buds
- * Opportunities
- * Thorns
- * Stars - moments of intensity
- Bold - Instructor notes

Apply the best learning science principles

For example:



- Preflection and self-regulation tools to help students learn better study habits
- Learning models with pre-, in-, and post-class activities so students come to class ready to learn and have multiple opportunities for exposure to the content
- Formative and summative assessments to support remediation where needed along with mastery
- Embedded active learning opportunities to promote learning and collaboration

“My students are actually coming to class with a basic understanding of the concepts so I can focus less on the basics and more on active learning -Tony Hascall, Northern Arizona University

Test in applied settings

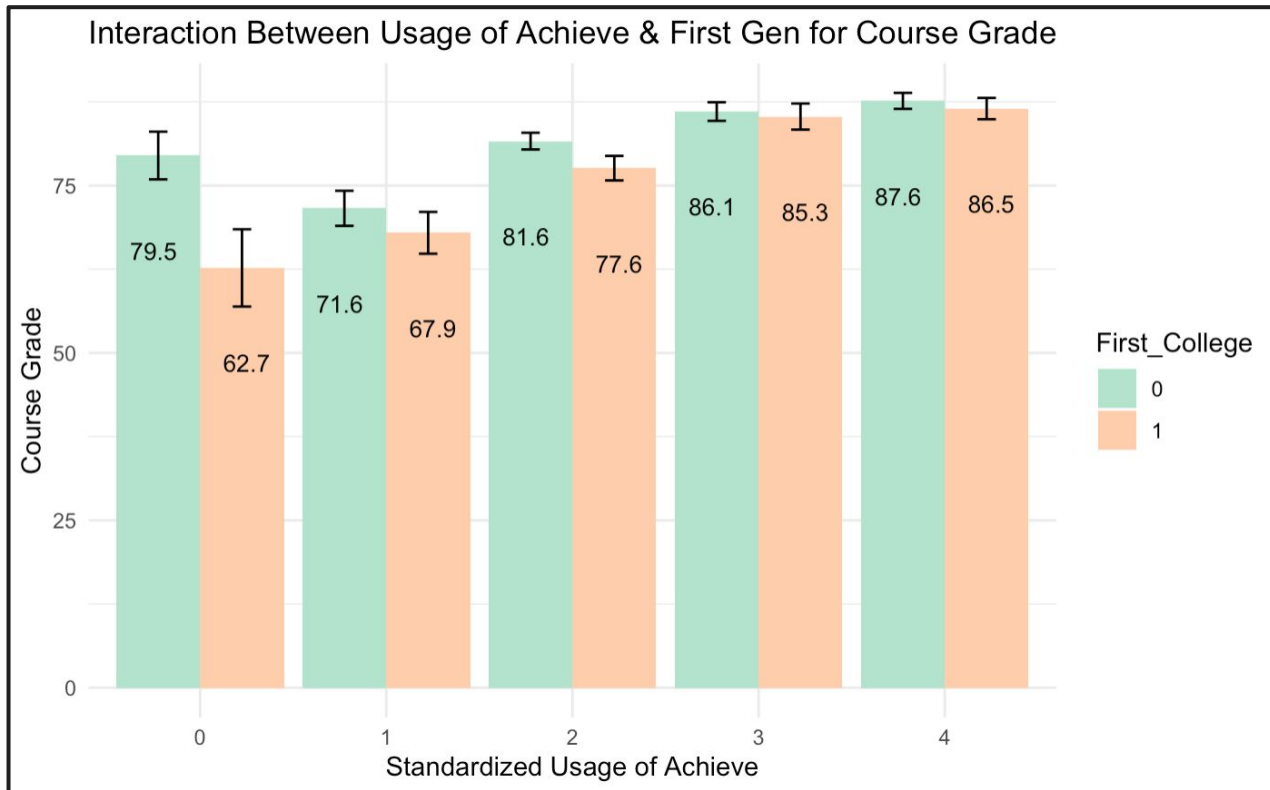
Predicted Course Grade from Gender, BIPOC Status, & **interaction between First Generation Status and Achieve usage categories**

Controlled for covariates:

HS GPA, Course Difficulty

Significant Interaction:

for those who don't use Achieve, being a first generation student is really hurting your grade, but **as usage increases, that gap vanishes**



Tips for identifying equitably developed content and technology

Some things to ask about...



- **Did you co-design your product with your target audience? Can you share the demographics and sample size?**
- **Did you follow Universal Design for Learning principles?**
- **What testing did you do to ensure your content was relevant to the target audience?**
- **How did previous research inform your decisions about content to include in your product?**
- **Have you actually tested your product in applied settings with the target audience? What did you learn? What was the sample size and demographics?**