

The Many Futures of CS Education

SIGCSE **L.A.** Panel+Discussion
February 18, 2026



Panelist introductions...



Lauren Bricker
UW

here!



Julie Medero
HMC

here!



Adam Blank
Caltech

arriving?



Zach Dodds
HMC

here!

Radical Inclusivity

Lauren Bricker, University of Washington
bricker@cs.washington.edu

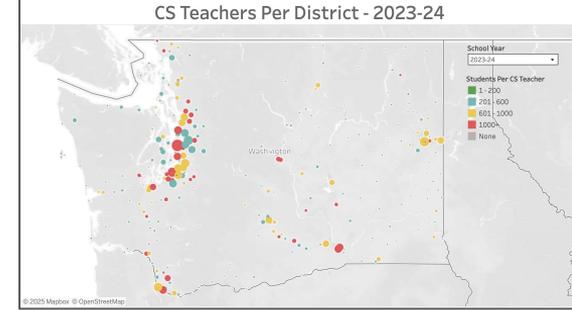
What percentage of students who enter the college intending to study engineering actually complete engineering degrees?

- Nationally 4 year graduation rate: 30%, 6 year: 55% (ASEE, 2017)
- Historically at UW, it's 50%

Barriers to entry

Historically **25%** of first-generation, low-income students, and students from underserved communities who enter the UW as pre-engineers will earn a degree in the field

These students also have difficulty getting admitted to engineering programs because of inadequate HS preparation



Your ZIP code shouldn't determine whether you can become an engineer.

- Dr. Eve Riskin Former Associate Dean for Diversity and Access College of Engineering

We can't expect students to be college-ready; we need to be student-ready colleges.

- Dan Greenstein, formerly of the Gates Foundation and Pennsylvania Chancellor on a panel in September 2019 that Dr. Riskin attended

Pathways for Inclusive Excellence

HS Senior Year PIE Pathway Admissions

Students are identified during the university admission process and assigned STARS (2 years) or Allen Scholars (1 year)

Year 1 First year support

Academic support, cohort building, near peer mentor support, and proactive advising

Program completion Conditional Admission

Transition to their major upon completion of the program requirements

Pre-Autumn Summer Bridge Course

Four week summer transition program

Year 2 Second year support (STARS)

Continued academic support, cohort building, near peer mentor support, and proactive advising

UW Graduation



CSE supplemental workshop course structure

- **Workshops** (once weekly) to reinforce and practice concepts.
 - Active learning, collaborative group work on worksheets and whiteboards
 - Twice quarterly small group presentation problems with TA feedback*
 - Mock midterm and final with TA lead Show What You Know (SWYK)*
 - Weekly assessments with quiz corrections if needed
- **50-minute work sessions**
 - **25-minute check-in meetings** (once weekly) with TAs
 - **25-minute study time** with post work reflection
- **Weekly pre-work** due before workshop and check-in meetings.

* Oral assessments of knowledge

Recent program results

STARS results (cohorts 1-11 (2013-2023))

- 352 students served
- 96% retained in year 1, 82% retained through year 2
- 78% graduate

Detailed data from students Fall 2015-Fall 2017

Time to Graduation	4 years	5 years	6 years
UW Seattle grad from UW Seattle	68.4%	80.8%	82.3%
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Allen Scholars results (from Fall 2022)*

- 156 students served
- 88% are first-generation college students and 65% are low-income students compared to Allen School demographics (26% and 18% respectively).
- > 96% of Allen Scholars students have successfully completed the Allen Scholars program and transitioned into an Allen School major

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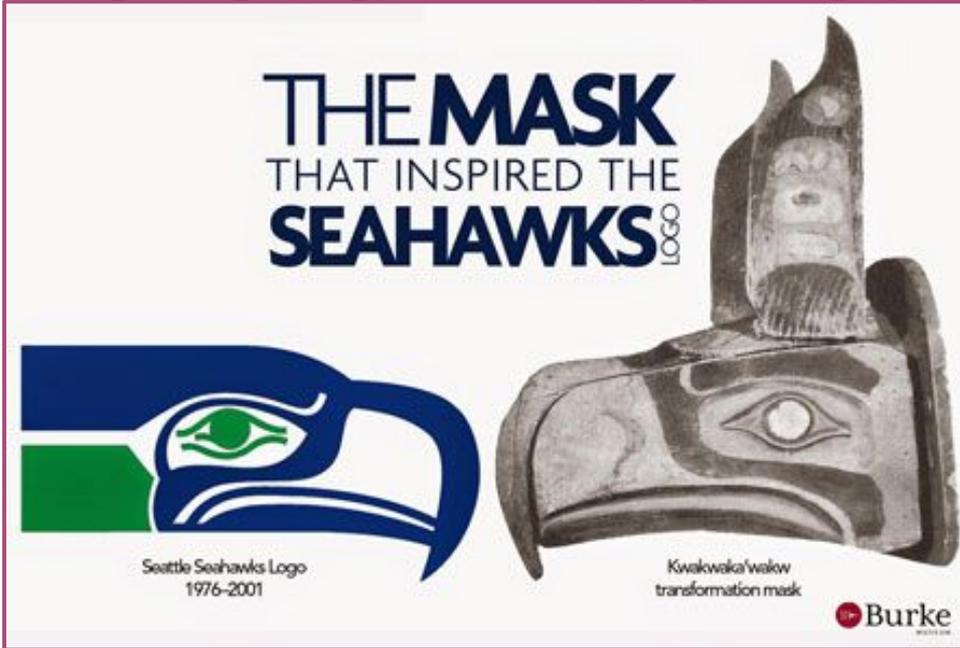
The North Star...

Students don't have the added cognitive overhead of navigating support at UW...

...the support is built in to their program

The future...

The future of these teams is very uncertain:



corrections) to engage students in the learning

Los Angeles isn't the only "LA" ...

Human-in-the-Loop CS Education

Julie Medero, HMC
medero@cs.hmc.edu

My **flavor** of Intro CS:

- Part of a pass/fail gen ed requirement for all first year students
- Aimed at students with ~one year of high school CS (e.g, AP CSA)

Course Goals:

- Eliminate the “**magic**” from CS (transistors through proofs of uncomputability!)
- Expose students to the breadth of CS
- Manage *wildly* different prior experience, without any extra “credit” as a carrot



Human-in-the-Loop CS Education for me:

Content in class varies each year based on student self-assessments

What do we want practice with?

- Program in Picobot
- Use list comprehensions in Python
- Stack modeling (with and without recursion)
- Work with character representations in Python
- Honorable mention: Lists of Lists; Recursive Functions

Today/Thursday!

Today/Thursday!

Human-in-the-Loop CS Education for me:

Flexible paths through assignments, with recommendations based on student self-assessments

Print Debugging in Python

Print Debugging in Python

Overview: Strategically use print statements to debug Python functions.

Relevant CS 5 Gold Homework Problems: N/A. To demonstrate this learning objective, you should document one Python bug that you found with a print statement. Be prepared to explain to your prof (1) how you decided to place the print statement and (2) what it revealed.

Challenge Options: Consider exploring the python logging library for [another way to track messages from your code](#) . What are the advantages of using a logger? Why might you still sometimes want to use print statements?

Human-in-the-Loop CS Education for me:

Standards-based grading: students can demonstrate learning objectives *any* week, but need to demonstrate *all* learning objectives at basic proficiency to pass

<p>🔒 Print debugging in Python view longer description threshold: 2</p>	<p>2 pts Demonstrated</p>	<p>1 pts In Progress</p>	<p>0 pts Not Yet Discussed</p>	<p>0 / 2 pts</p>
<p>🔒 Program in Picobot view longer description threshold: 2</p>	<p>2 pts Demonstrated</p>	<p>1 pts In Progress</p>	<p>0 pts Not Yet Discussed</p>	<p>1 / 2 pts</p>
<p>🔒 Use numeric data types in Python view longer description threshold: 2</p>	<p>2 pts Demonstrated</p>	<p>1 pts In Progress</p>	<p>0 pts Not Yet Discussed</p>	<p>1 / 2 pts</p>
<p>🔒 Work with character representations in Python view longer description threshold: 2</p>	<p>2 pts Demonstrated</p>	<p>1 pts In Progress</p>	<p>0 pts Not Yet Discussed</p>	<p>2 / 2 pts</p>

Human-in-the-Loop CS Education for me:

No grading of code/artifacts: All grading happens in one-on-one meetings with the instructor



Human-in-the-Loop CS Education for me:

“High pass” grades are based on *experiences*, not just assignments.



What's working (better)?

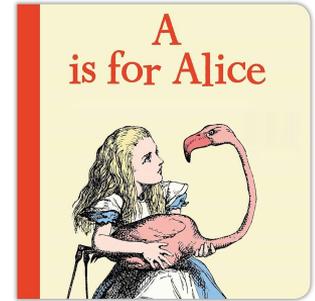
- Artifacts both over- and under-estimate student understanding
- Conversations focus on *understanding*, which removes the incentive to create an artifact at an arbitrary deadline
- Flexible deadlines let students go back for more practice
- Student-informed content with buy-in
- Flexibility helps build a cohort identity
- Students learn lessons (e.g., about the importance of documenting code) authentically, not as side-effects of assignment requirements

What's ... *not*?



CS is for

Community Shaping



Zach Dodds, HMC
dodds@g.hmc.edu

What *should* Higher Ed do?

Explore techniques for students' self-expression, proactive learning, and societal agency.

- ↻ *Computing* is valuable on all three fronts...
- ↻ *Conversation* is valuable on all three fronts...

universally
We're^v using *Computing Conversations* Fall25+Spr26

- ↻ Q'n 1: Can we scale Julie's one-on-one conversations using TAs?
- ↻ Q'n 2: Can we scaffold them so that *all participants* emerge happier?
- ↻ Answer: We can at least *try*...



secret ingredient ~ *grutors*

i.e., a special blend of molecules known as "*people*"

Weekly Share-outs

195 students/week ~ 15 minutes/demo

Tuesday, September 30											
1:15-3:45pm session											
1:15-1:45pm	elia Tripp Wiseha	Charlotte Wong	Bethany Prado	Stella Gajar	Carol Wang	Jack Paavola	Nayah Torres	Claire Johnston	Maya Sprosts	Oliver Tumolo	ten spots in this half-hour
2:00-2:30pm	Ryan Bram	Janety Zhang	Jaahnavi	Peter Phan	Zara Ansari	Ethan Hoen	Oliver Kiehl	Harry Webster	Olivia Markowich	Aaron Gonzalez	ten spots in this half-hour
2:45-3:15pm	Cole Boake	Anya Sheng	William Jones	Charlie Hill	Raphael e	Alice Kelly	Cory Welch	Karen Kitchen	Beckett Heywood	Hayat	ten spots in this half-hour
3:15-3:45pm	Natalie Huang	Serafina Figlozzi	Cooper Giles	Michael Yao	Cindy Nguyen	<Jordan Yates>	<Terry W>	Wes	<>	Avi Palomino	ten spots in this half-hour
6:00-8:00pm session											
6:00-6:30pm	Emmie Ding	Angel Wu	Adriana D.	ryan yoo	Hanwen Miao		<name>	<name>	<name>	<name>	ten spots in this half-hour
6:45-7:15pm	Eileen Wang	Yichen Yao	izabeth Hernandi	Zoe Craft	<Alexandra Ye>	<name>	<name>	<name>	<name>	<name>	ten spots in this half-hour
7:30-8:00pm	Brennan Tobin	Oliver Flor	Blaze Hedani	ackson Giumarr	evelyn law	cindy fan	Abdullah Ali			<name>	ten spots in this half-hour
8:00-10:00pm session											
8:00-8:30pm			Sihan Qiao	<name>	<name>	<name>	<name>	<name>	<name>	<name>	ten spots in this half-hour
8:30-9:00pm	Cassidy Goya	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	ten spots in this half-hour
9:00-9:30pm	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	ten spots in this half-hour
9:30-10:00pm	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	ten spots in this half-hour
<div style="background-color: #e0f0ff; padding: 10px; border: 1px solid #add8e6;"> <p>Spreadsheet sign-up: 12 hours, 24 peer tutors</p> </div>											
Wednesday, October 1											
1:15-3:45pm session											
1:15-1:45pm	Grace Regier	Jack Sample	Cate Lee	ramis Thai-Garic	Evan Davis	Caitlin Kuhlmann	Rain Hannsz	vetha Madhanraj	Jonah Mayo	Duc Nguyen	ten spots in this half-hour
2:00-2:30pm	Ysabel Chu	a Hernandez-Alv	Lucien O'Neil	Erin Weir	Richard Burrow	Star Grote	Gwen Severson	Matthias Kim	Chloe Polin	Vern Van Asdale	ten spots in this half-hour
2:45-3:15pm	Taylor Rienhart	William Ngo	Damian Argueta	Alan Liu-Sui	Ash Ragins	Ethan Chin	Aidan Cho	Erick Velarde	Stephanie Corre	Adriana L.	ten spots in this half-hour
3:15-3:45pm	Oscar Zhao	Amanda Phillips	Rain Salkever	Charlie Medina	abu Heikaus Wee	Gulzar A	<name>	<name>	<name>	<name>	ten spots in this half-hour
6:00-8:00pm session											
6:00-6:30pm	Abbie H	ddison Mae Mye	Anna Berman	Jairo Jasmin		<Avery Tin>	Elaina Garg	Olivia Yan	Kelly Zhou	Juntong Zhou	ten spots in this half-hour
6:45-7:15pm	Jorge Pacheco	Caleb Settles	Ethan Kim	Shawn Dahiyat	Tyler Chelew	Amelia Carlino	Diego Amescua	Sophia Rico	<name>	<name>	ten spots in this half-hour
7:30-8:00pm	Meha Chaudhary	Nastia Derepa	Kylie Brunelli		Jiselle Nguyen	Ivan Rugamba	Samuel Wang	Zoe Craft	<Joshua Rios>	<name>	ten spots in this half-hour
8:00-10:00pm session											
8:00-8:30pm	Outreach program spots (outside the 5Cs)										ten spots in this half-hour
8:30-9:00pm	Lily Horn	Molly McLaughlin	Abigail Stewart	Lawrence Notar	Arman Rudar	Shifali Dinesh	Luci Dunn	Michelle Lu	Sean Beltran	Katja Gentleman	ten spots in this half-hour
9:00-9:30pm	isabella rhee	misty bera	Frander Pena	Bella Jiao	JuliuZ Salazar	Nia Ho	Matthew Cabrera	Leonardo Castro	Kylie Brunelli	<name>	ten spots in this half-hour
9:30-10:00pm	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	<name>	ten spots in this half-hour

Weekly Share-outs

195 students/week ~ 15 minutes/demo



8:00pm W

Students set-up-shop...
Peer-tutors rotate...
~5 min each...



Who's who?

2:00pm T

Weekly Share-outs

Each share-out "script" is known ahead of time...

hw3: Demos

T 9/23 and W 9/24

Name: _____ first + last

1. Ready? Grab one of these pages + set up your files...
2. **Grutors**: Circulate, keeping things fair + flowing
3. **Each demo**: Aim for 2-5 minutes...
4. (If it's busy, we can use the board to keep track)
- 4.1 Pairs can demo "individually, together"!
- 4.2 **Stickers** optional... Check out when finished...

strings

grutor

1. In VSCode, show off your decipher function:
 - (a) Try it at the terminal, on a string of your choice where it works.
 - (b) Make up a real English sentence where it fails! (Hint: use text for its own sake, e.g., "Zqvq isn't a real word!" or "It sounded like Zzzz..." Demo your own variation...
 - (c) **Why** does the code not "work" in this latter demo?
2. In VSCode, show off your jscore function:
 - (a) Show two 5-letter words that get a 0.
 - (b) Show two 5-letter words that get a 5, but aren't the same!
 - (c) Would it be easy or hard to change jscore so that it only scored letters at the same index? (Wordle-green vs. Wordle-gold)

grutor

sound

1. Show off your sound file...
Q'n: Do you have **reverse**? **static**? **echo**? If so, demo!
2. [Thought experiment] Would speech-recognition software have an easier or harder time learning to **interpret (a) reversed speech, (b) static speech, (c) echoing speech**, as compared to humans? Is the answer (easier/harder) the same for all three, or different from case to case?

the BFF

"the blank-file function"

Demo a call to a new API – and extract a piece of data from it!

- (*) Check out the website pokeapi.co
- (a) Try their "direct link to results" API call, for ditto: 
- (b) Using copy-and-paste in a new cell in your hw3pr2 API Colab notebook, make the same call *programmatically* from Python...
- (c) show that you can obtain the same results in the notebook as in the browser directly
- (d) from the resulting dictionary (json), deliberately extract one piece of data ... all the way down to a string or a number
- (e) Run the same code on a different pokemon!

grutor

hw5: Demos

T 10/7 and W 10/8

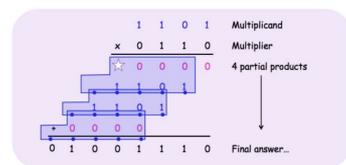
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multiply!

grutor

1. Show off your multiplier 
 - (a) Does 6x7 work? Does 7x6 work? 15x15? Others?
 - (b) Show where some of the digits/dots in this picture of the multiplication algorithm match those in your circuit:



extra  Divider?

grutor

add!

grutor

- A. Show off your Ripple-Carry Adder... 
 - (1a) Here, choose four bits for the top input: y3,y2,y1,y0
What decimal value is this?
 - (1b) Next, choose four bits for the other input: x3,x2,x1,x0
What decimal value is this?
 - (2a) Explain what the decimal value is for the result (the sum)
 - (2b) Did it work?! 
- B. Delete one Full Adder row -- just disconnect one AND's inputs
 - (1) Note which input bits are now incorrect ...
 - (2) Then, create a ripple-carry example that is *also* incorrect ...
 - (3) Explain how the error shows up in the ripple-carry!Finally, be sure to fix your Full Adder 

the BFF

"the blank-file function circuit"

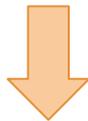
Head to this url:

- circuitverse.org/users/26206/projects/bff-but-for-circuits
- (1) Create a new fork – or copy – of this public circuit.
 - (2) It has a truth table with four input bits and one output bit.
 - (3) What are the **values** of the inputs that have 1 as output?
 - (4) **Build this circuit!** You can use "standard minterm" ... OR ...

Optionally ... you can try to optimize with fewer AND gates!
We don't know the minimum ... yet  

Three components of ~5 minutes each. The "BFF" is the Blank-File Function

Weekly Share-outs



Weekly Share-ins



the BFF "the blank-file function"

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grutor



Charlie



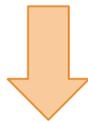
Sean



Charlotte

Celebration of shared interests ...

Weekly Share-outs

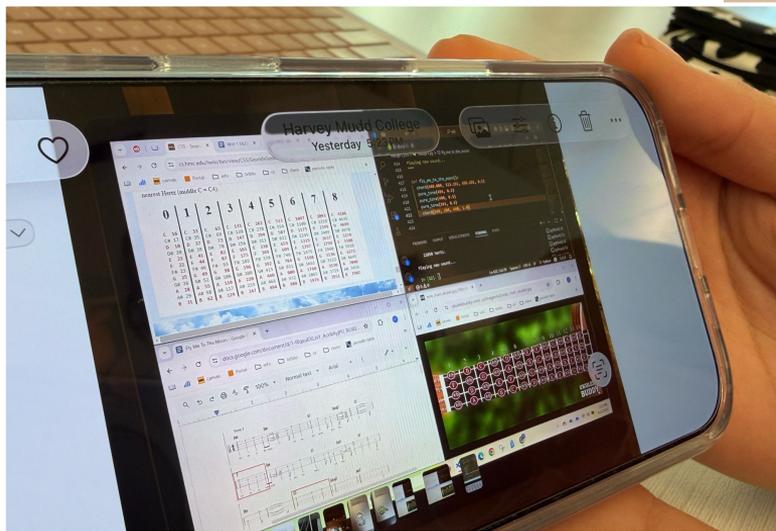


Weekly Share-ins

Workflow Insights!

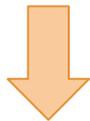


Naya and Cooper



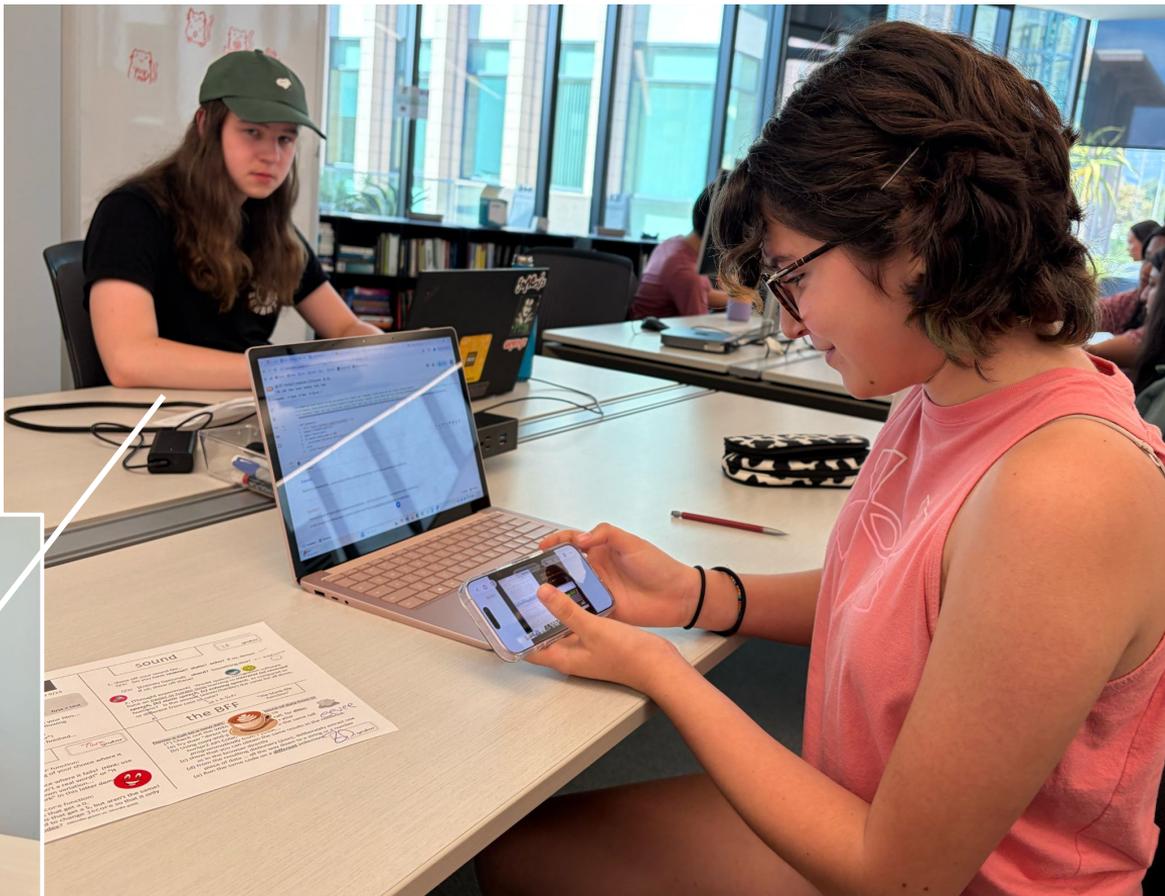
Not Complete? Not complete **yet** ...

Weekly Share-outs



Weekly Share-ins

Sentimentflow Insights!



Naya and Cooper



Cooper

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The One Future of CS Education



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Computing centers the interpersonal ...
... *however challenging* that might be!

Provocations + Prompts:

What is being taught now that won't be relevant in the future?

What do you feel you're "forced" to include? *An, by whom?*

What skills/topics will be more important in the future than now?

What do we value now that will have lasting value well beyond what is being acknowledged by this moment's headline cycle?

Is the audience for computing skills and sophistication growing? *Should it be?*

What should students know experientially about

(a) LLMs + AI? (b) Computing? (c) College+Career? (d) Life?

What else should we be asking or talking about?!?

Debrief + Declaim...

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Thank you!

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Lauren Bricker, University of Washington
bricker@cs.washington.edu

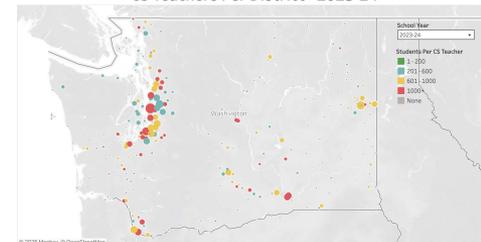
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These students also have difficulty getting admitted to engineering programs because of inadequate HS preparation.



Your ZIP code shouldn't determine whether you can become an engineer.

- Dr. Eve Riskin Former Associate Dean for Diversity and Access College of Engineering

We can't expect students to be college-ready; we need to be student-ready colleges.

- Dan Greenstein, formerly of the Gates Foundation and Pennsylvania Chancellor on a panel in September 2019 that Dr. Riskin attended.

Pathways for Inclusive Excellence

Admissions

Students are identified during the university admission process and assigned to one of the following based on need:

- STARS Engineering (1 year)
- STARS Engineering or Allen School (2 years)
- Allen School Scholars Program (1 year)

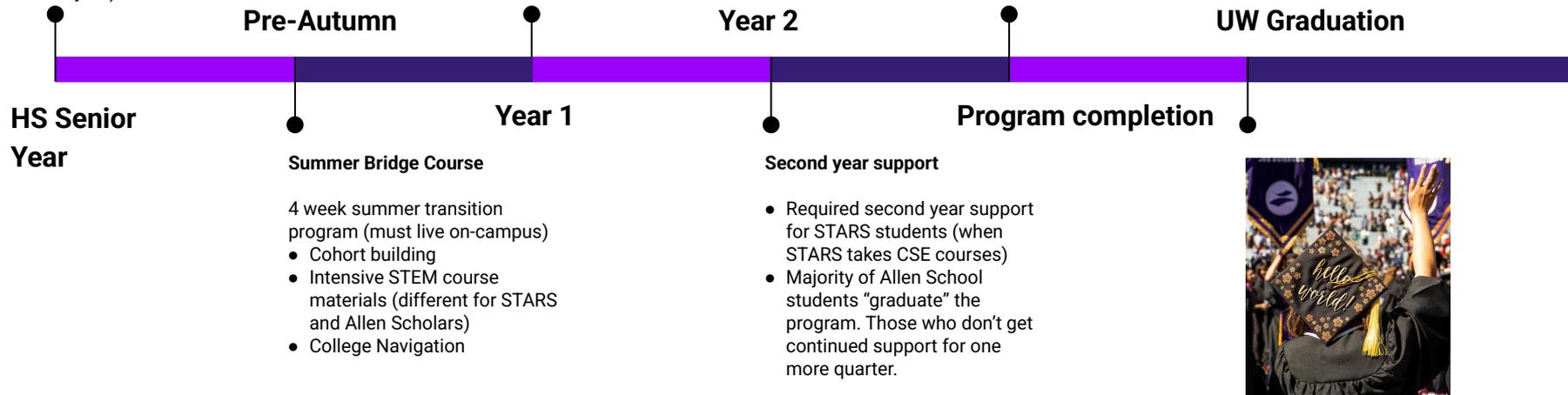
First year support

- Supplemental workshops (Math, Science, CSE, (for Allen Scholars), etc)
- Near peer mentor support
- Required cohort meetups
- Intrusive advising (as needed)

Conditional Admission

Completion of the Program/requirements is a condition of their full admission to the department or school

- Commit to participate
- Culture of excellence & support
- Discomfort is essential for growth



CSE supplemental workshop course structure

- **Workshops** (once weekly) to reinforce and practice concepts.
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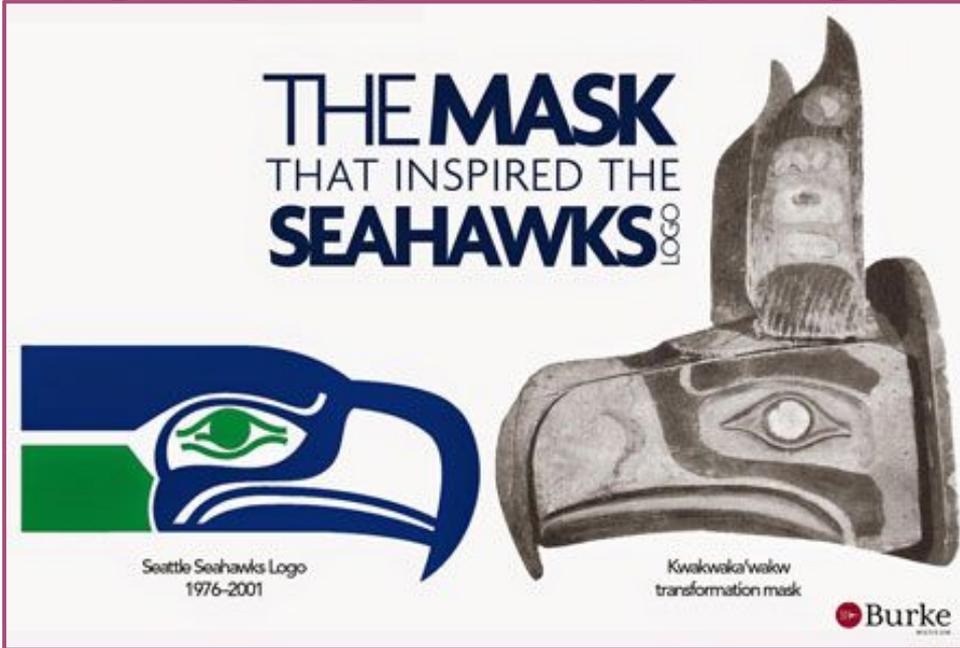
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The future...

The future of these teams is very uncertain:



corrections) to engage students in the learning

Los Angeles isn't the only "LA" ...

What's ... *not*?



Spending our time where it counts!

Adam Blank, Caltech
blank@caltech.edu

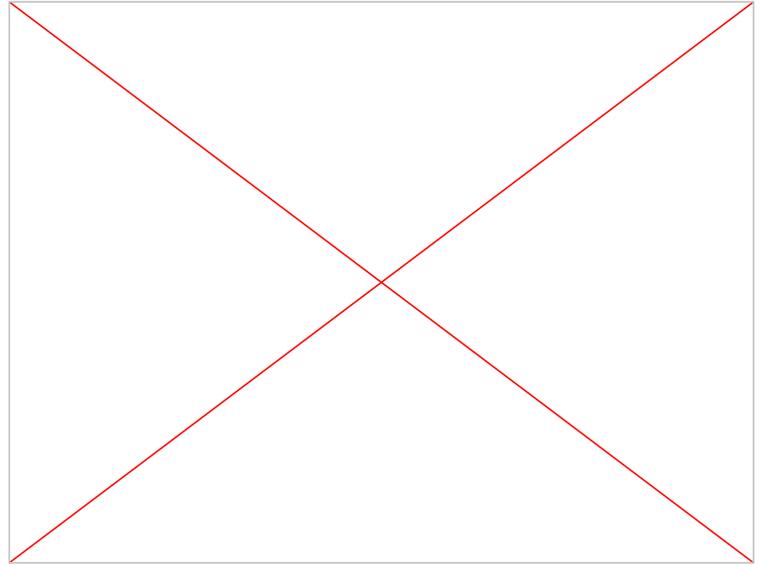
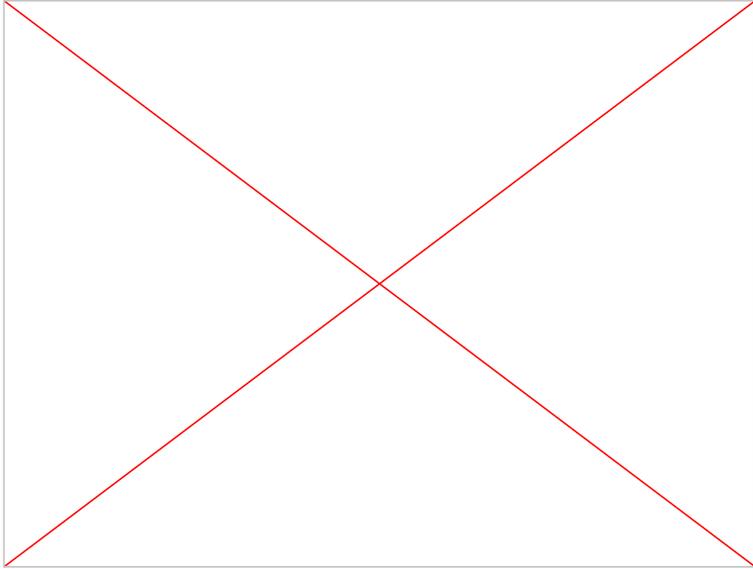


Courses are *ecosystems*...

- **Actors:** students, TAs, instructors, staff
- **Products:** grades, code artifacts, learning (???)

**What products are important
enough to spend actor time on?**

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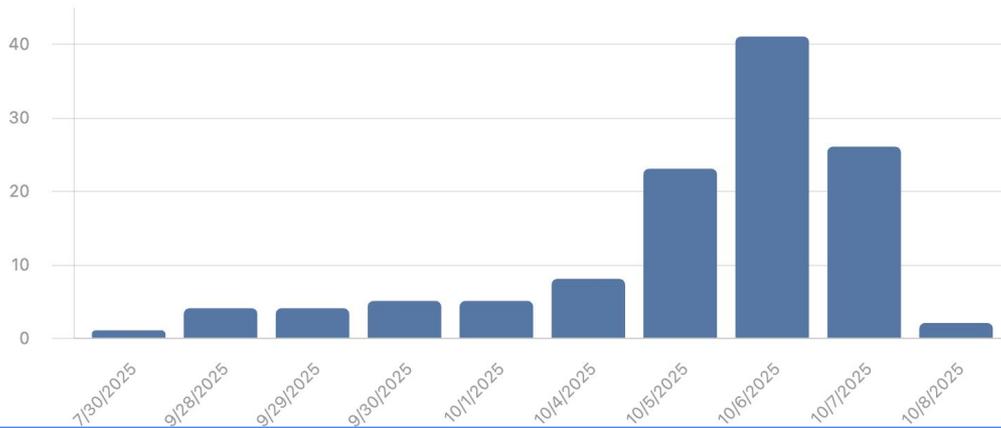


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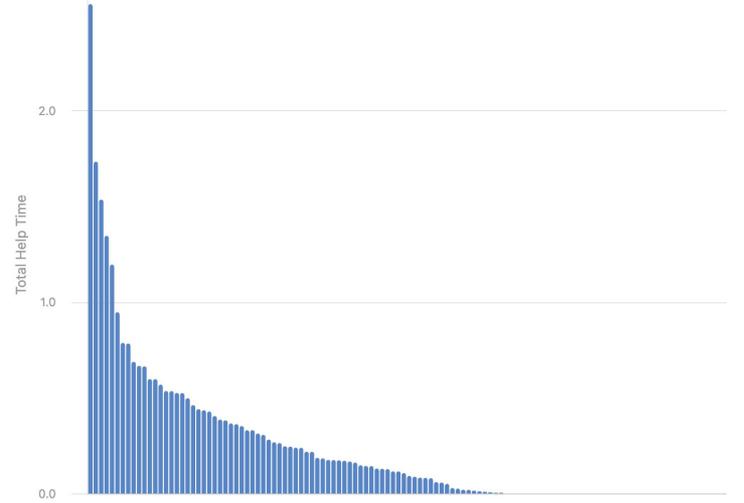


What products are important enough to spend actor time on?

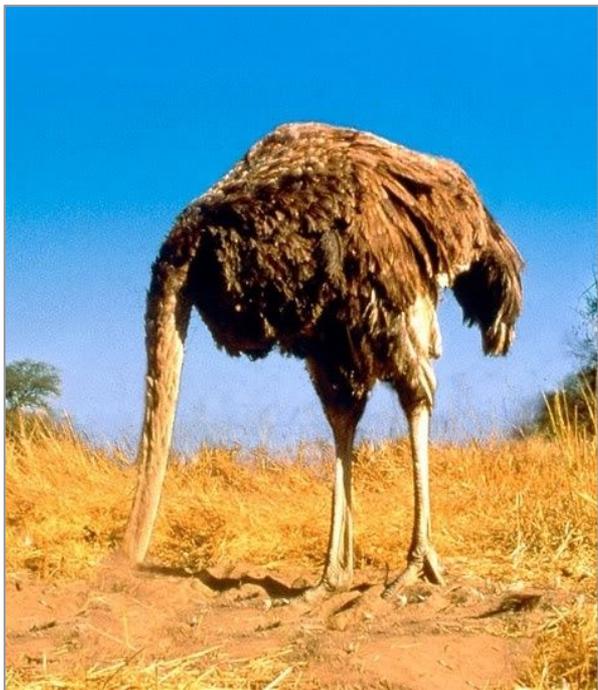
Number of Students by Day



Total Queue Help Time (in hours)



Before:



After:





Share out

What is being taught now that won't be relevant in the future?

what do you feel you're forced to include?

Shell Scripting?
(there's a story...)

current JavaScript frameworks
e.g. REACT

Python over Java
is being taught
in CS

What skills/topics will be more important in the future than now?

Embracing failure/recovering from failure

Interdisciplinary teaching

Communication (oral)

Still not a fraction of academic population researches CS, like not not

What do we value now that will have lasting value well beyond what's acknowledged by the current hype cycle?

Systems thinking

Multi-Disciplinary Collaboration

Systems thinking

Growth mindset

How to human

Community working from impostor syndrome

What else should we be talking about?!

Classes beyond intro?

"vibe to value"

Ethical implications of AI

is the audience for computing skills and sophistication growing? Should it be?

"biologists think we're scary"

CS should collaborate more with other sciences to make sure it is effectively used in apps

What should students know Experientially about

- a) LLMs + AI?
- b) Computing?
- c) College & Career?
- d) Life?

design
Software engineering

Students should know that LLMs are magical (a)
- students should be aware of the current job market (a)
- error handling, input, integrating your knowledge and being efficient

- problem-solving skills
- time management
- humanizing computer science
- critical thinking

College + Career -
Students shouldn't focus on specific knowledge bases but have to adapt to future knowledge base

The CS Core Curriculum Rebalances Knowledge, Skills, and Dispositions

John Stratton, Whitman
strattja@whitman.edu

What does the ACM say now?

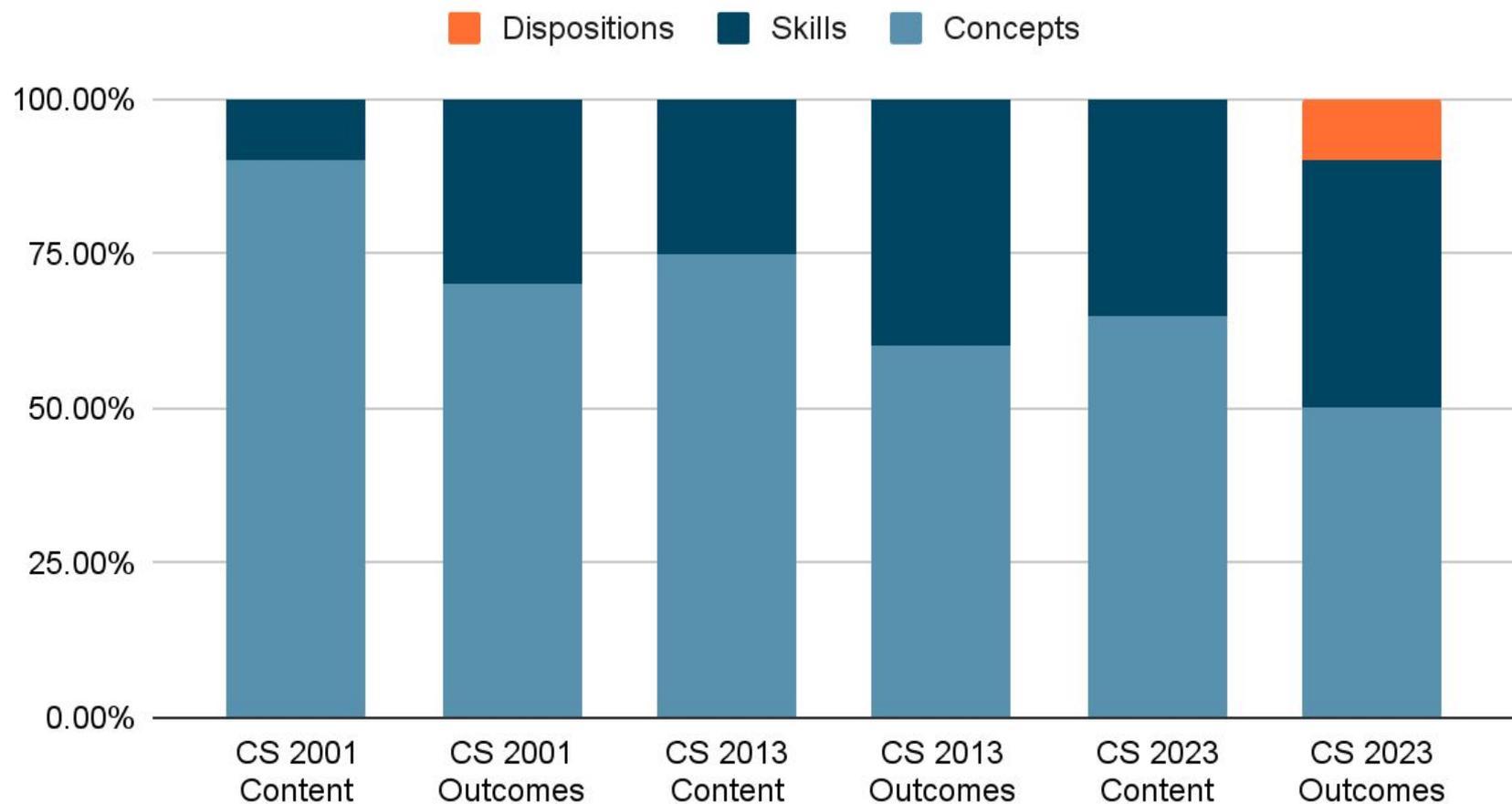
Details of the knowledge areas are in Section 3 of this report. In CS2023, knowledge areas have been expanded to include in addition to knowledge units:

Knowledge area = { Knowledge units } + { }

- A. Concrete Skills
- B. Professional Dispositions
- C. Learning Outcomes
- D. Professional Skills

Professional dispositions are malleable values, beliefs, and attitudes that enable consistent [, desirable] behaviors

ACM CS Curricula Emphasis (Eyeball test)



Social >> Interactive

Many technologies have been used to make learning more interactive

- Great for teaching concepts
- Good for practicing skills

Dispositions are about values, beliefs, and attitudes, which (I believe) are ***socially constructed***, and will/should be explicitly integrated into curriculum design.

Curricular space must be ***made*** for this to be added, but it's worth it.

Whitman's new CS curriculum

- Cut the amount of required **concepts** substantially
 - E.g. operating systems implementation, advanced algorithms, automata theory
- Spiraled our introduction of **skills**
 - e.g. task and project management, collaboration, testing + debugging
- Made room for explicitly addressing **dispositions**
 - Finding and using references
 - Persistence without spinning, help without dependence

Next steps...

if

your program is proactively --
and *radically* -- expanding access

you're looking to emphasize
mindsets as much as concepts

your department is considering
using student-directed learning

you'd like to redirect your time to
more meaningful tasks (at scale)

you're thinking of making
computing - or AI - *required*

then

chat with Lauren!

chat with John!

chat with Julie!

chat with Adam!

chat with Zach!

Slides



More slides!

here in the not-scheduled section,
we're all welcome to copy from other favorite
slide-creation sources, as well...

Claire!

~~Uncertain~~
Author!

