

# Classroom Design for Active Learning

Helen Y. Chu, Stanford University

March 2, 2020



This work is licensed under [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Please cite as Chu, Helen Y., "Classroom Design for Active Learning." Summer Institutes on Scientific Teaching. March 2, 2020.

[https://works.bepress.com/helen\\_chu/](https://works.bepress.com/helen_chu/)



# Mobile Summer Institute

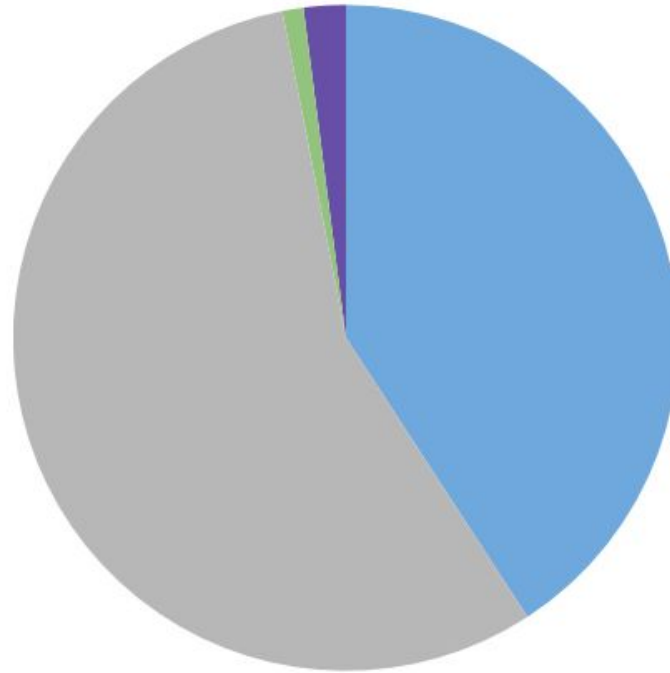
University of Oregon, Eugene, Oregon, July 2015



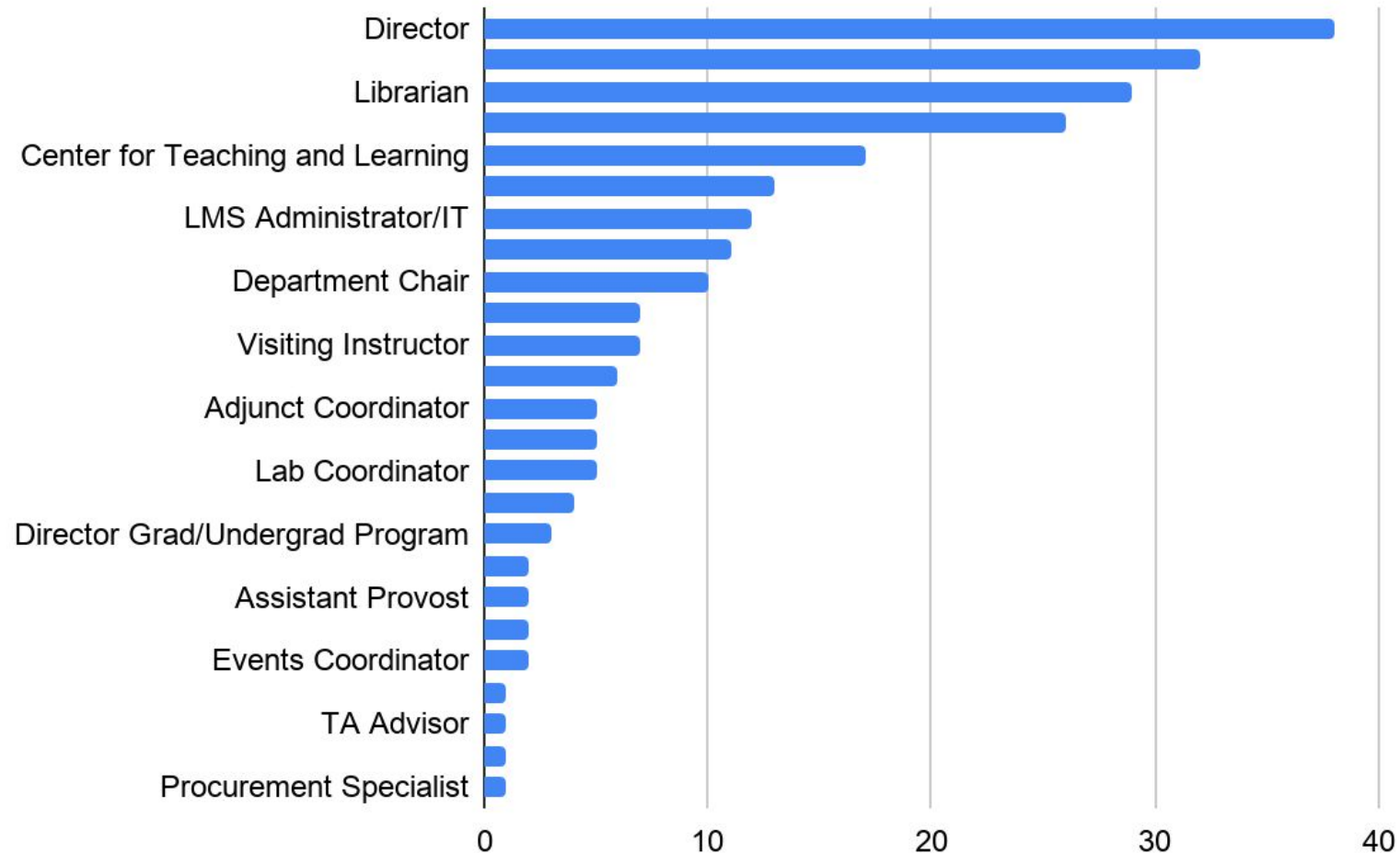


# About You

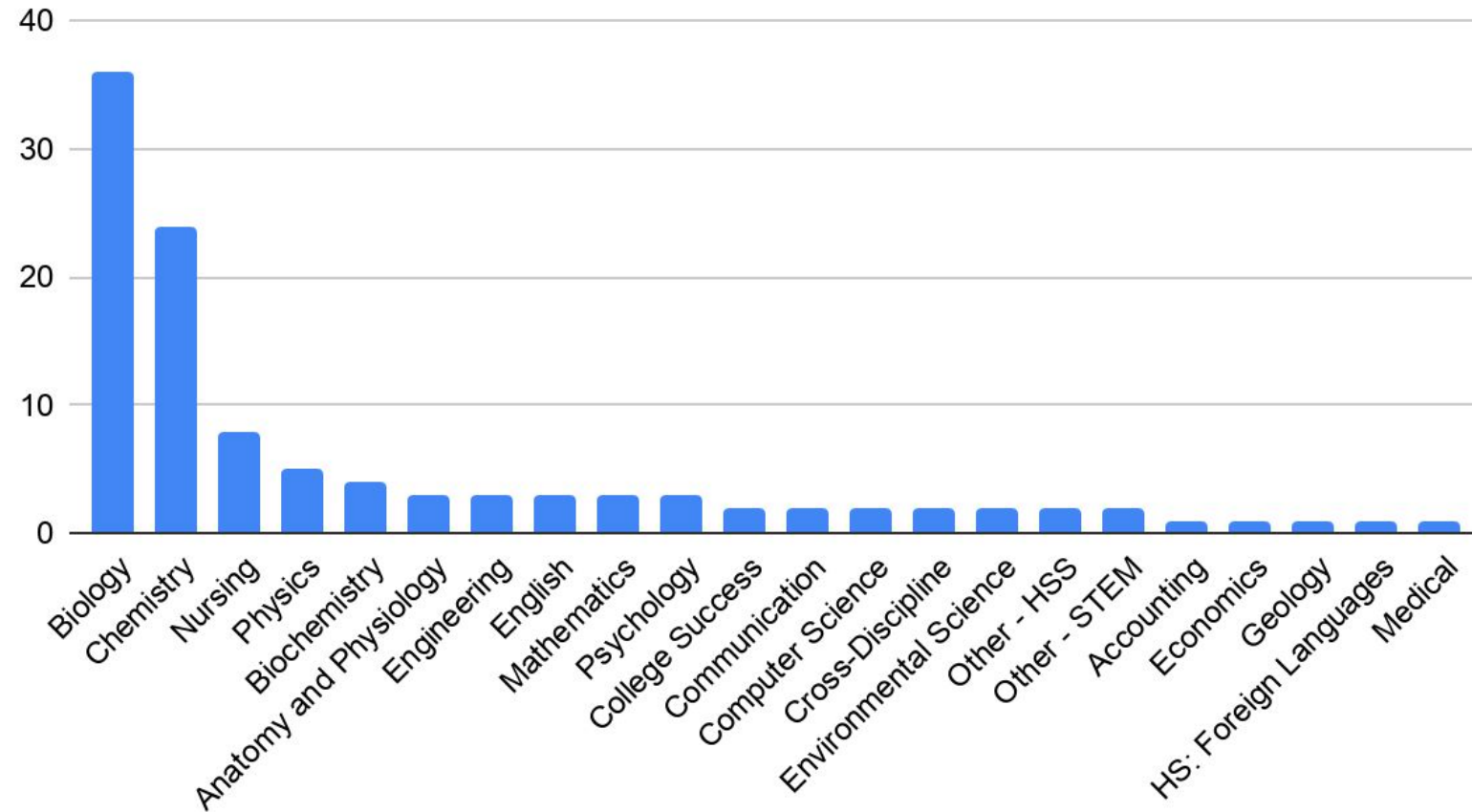
● Instructors 40%   ● Administrators 55%  
● Students 1%   ● Corporate Employees 2%



# Administrators: Function/Title

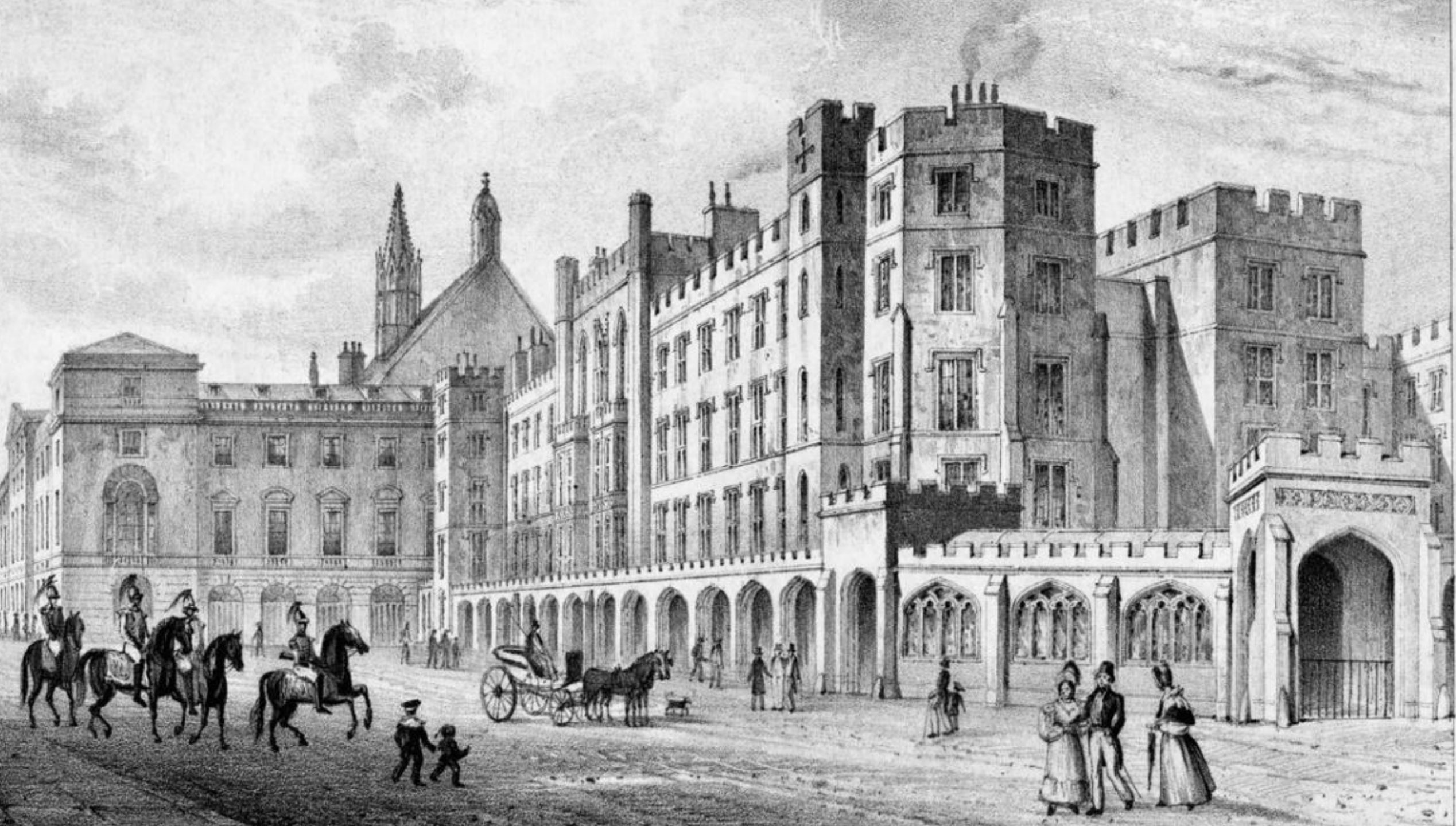


# Faculty & Instructors: Disciplines Taught



*Please write into the Questions Box.*

What are some of  
the best **features** of  
your **favorite classroom?**







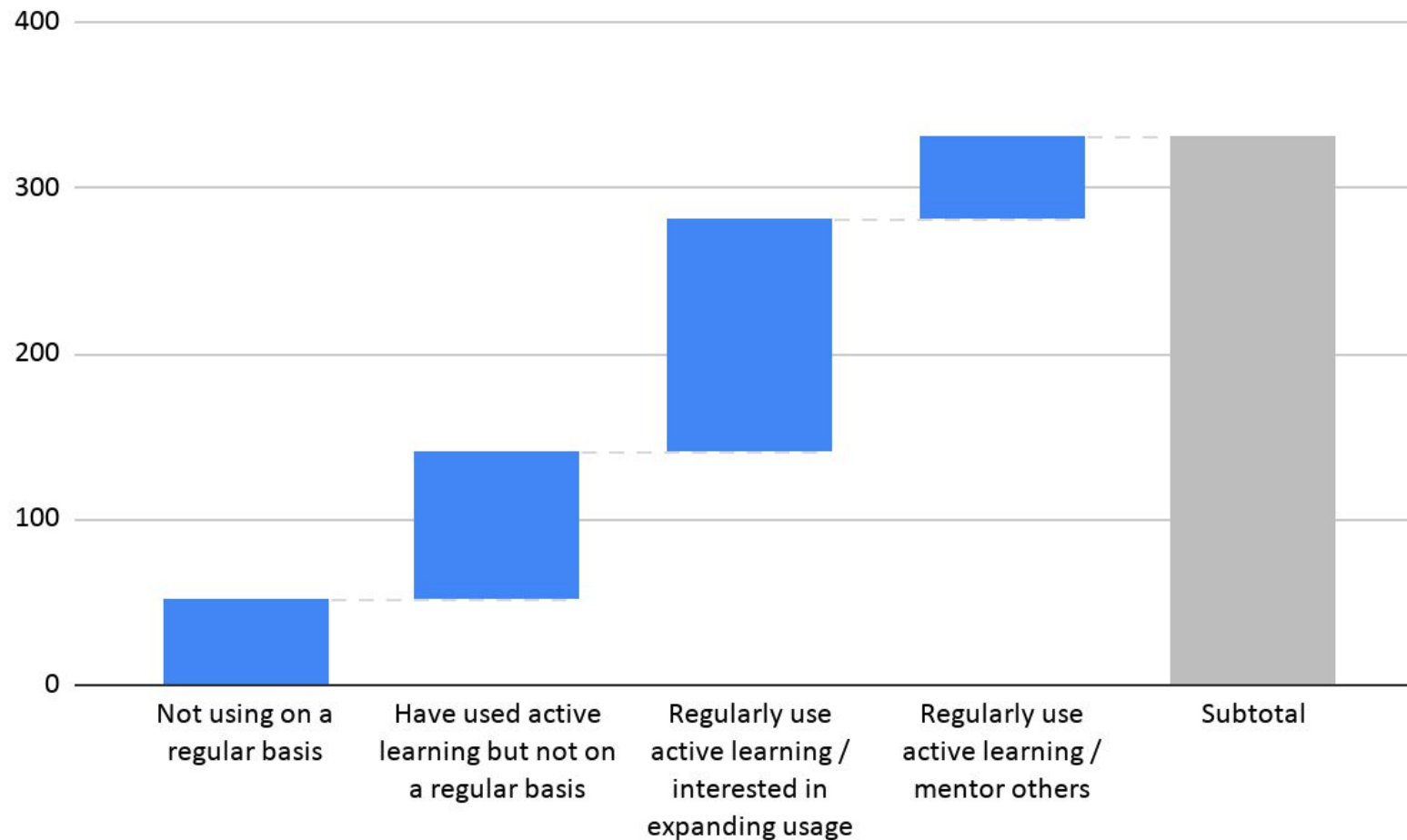


# Learning objectives

Participants will be able to

- Identify barriers and supports to active learning
- Identify workarounds for teaching in spaces that are not designed for active learning
- Apply the design principles to existing or new learning spaces
- Advocate for active learning spaces on campus

# To what extent to you employ active learning strategies in your classroom?





# Design Strategies for Active Learning

1. **Use** the space you have
2. **Remove barriers** to active learning
3. Design a more **inclusive** environment
4. Use the space to foster a sense of **belonging**
5. Promote **eye contact** (& community)

1. Use the space you have





*Poll: What kind of behavior was this space built for?*

- a. Lecture*
- b. Movie viewing*
- c. Group work*
- d. Instructor performance*
- e. Student performance*







## 2. Remove barriers

*In the Questions Box:*

What might constitute a barrier to active learning in a classroom?

- a. Immovable seats
- b. Writing surfaces too small and too high
- c. Instructor up on stage
- d. No space for student-to-student sharing
- e. Walls are not writeable
- f. No aisle access from sides of classroom















# 3. Design more inclusive environments



PERIODIC TABLE OF THE ELEMENTS

H																	He
Li	Be									B	C	N	O	F	Ne		
Na	Mg									Al	Si	P	S	Cl	Ar		
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	

UO CLASSROOM TECH SUPPORT

Call CNET at 541-546-3891 for immediate classroom support

UO CNET

UO CLASSROOM TECH SUPPORT

Call CNET at 541-546-3891 for immediate classroom support

UO CNET

UO CLASSROOM TECH SUPPORT

Call CNET at 541-546-3891 for immediate classroom support

UO CNET

PERIODIC TABLE OF THE ELEMENTS

H																	He
Li	Be									B	C	N	O	F	Ne		
Na	Mg									Al	Si	P	S	Cl	Ar		
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	





Larsen, J.B. & Blair, J.C. (2008). The effect of classroom amplification on the signal-to-noise ratio in classrooms while class is in session. *Language, Speech, and Hearing Services in Schools*, 39, 451-460. doi: 10.1044/0161-1461(2008/07-0032)

Lin, F. (2011). One in Five Americans Has Hearing Loss. Johns Hopkins Medicine. [https://www.hopkinsmedicine.org/news/media/releases/one\\_in\\_five\\_americans\\_has\\_hearing\\_loss](https://www.hopkinsmedicine.org/news/media/releases/one_in_five_americans_has_hearing_loss)



Photo credit: Amanda García, University of Oregon











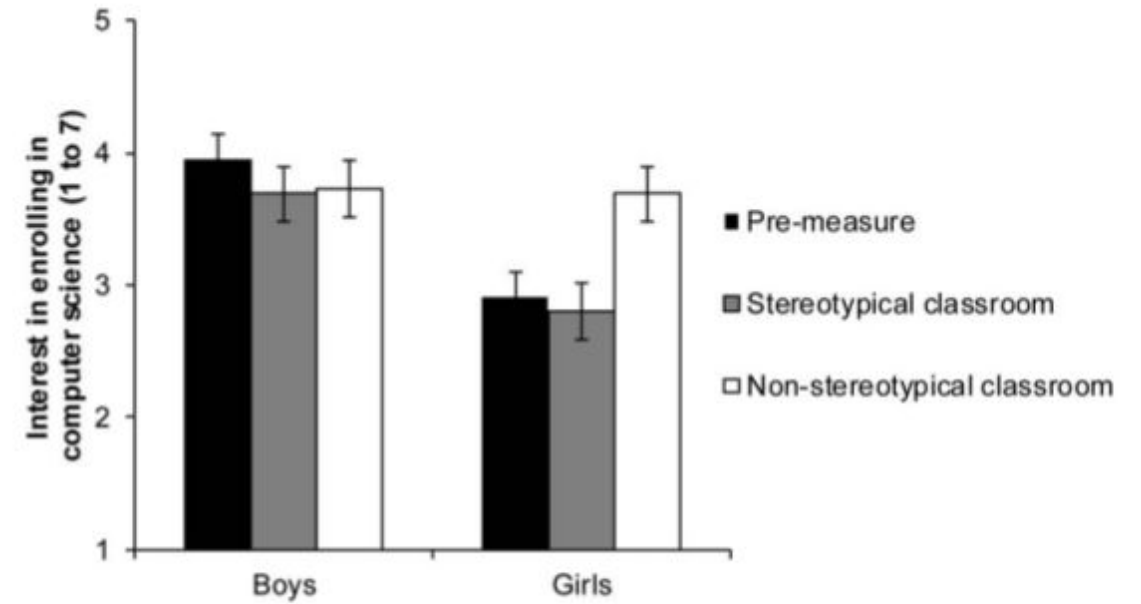




Write-to-think



4. Foster a  
sense of belonging



*Figure 3.* Interest in enrolling in the computer science course in Experiment 1. Girls were significantly less interested in the computer science course than boys in a premeasure and when the classroom contained stereotypical objects, but not when the classroom contained nonstereotypical objects. All error bars are  $\pm SE$ .

Master, A., Cheryan, S. Meltoff, A. (2015). Computing Whether She Belongs: Stereotypes Undermine Girls' Interest and Sense of Belonging in Computer Science. *Journal of Educational Psychology*, 108:3, 424-437.  
<http://dx.doi.org/10.1037/edu000061>



## 5. Promote eye contact







# Promote eye contact & build community

“feeling like they are **part of a community** increases both **performance** and **motivation**, especially for historically underrepresented groups.”

(Walton and Cohen, 2007; Walton et al., 2012).” (Eddy & Hogan, 2014)





# Design Strategies for Active Learning

1. **Use** the space you have
2. **Remove barriers** to active learning
3. Design a more **inclusive** environment
4. Use the space to foster a sense of **belonging**
5. Promote **eye contact** (& community)

*Activity: (write in the question box)*

Keeping in mind the design principles we just talked about, what are some things you can do if you were assigned to this classroom?





# Workarounds

# Workarounds

Add microphones





# Workarounds

Add writing surfaces



# Workarounds

Make eye contact

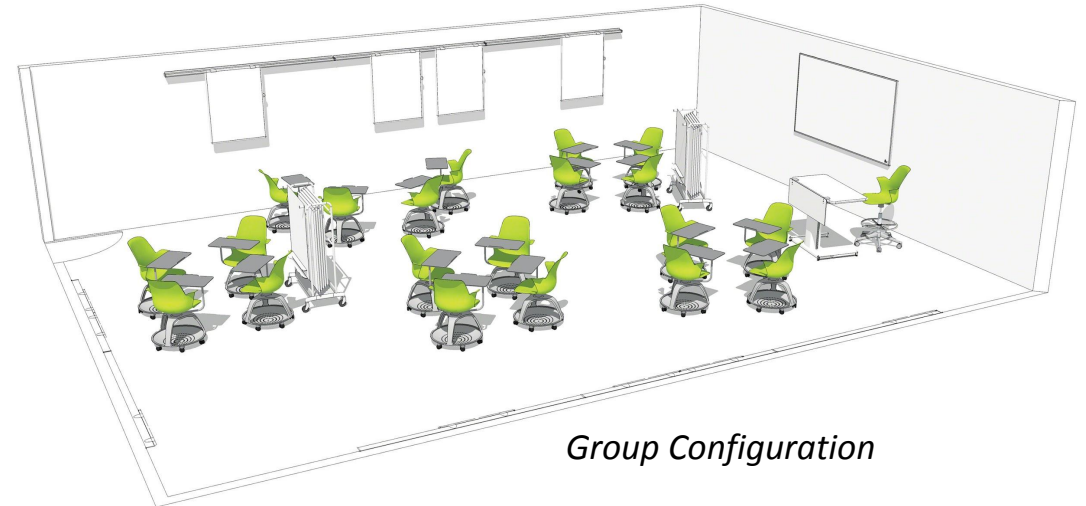
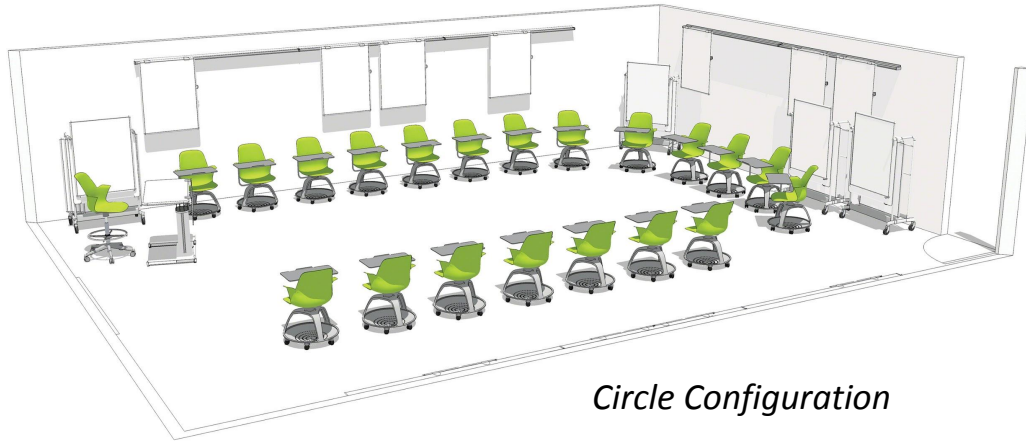




# Workarounds

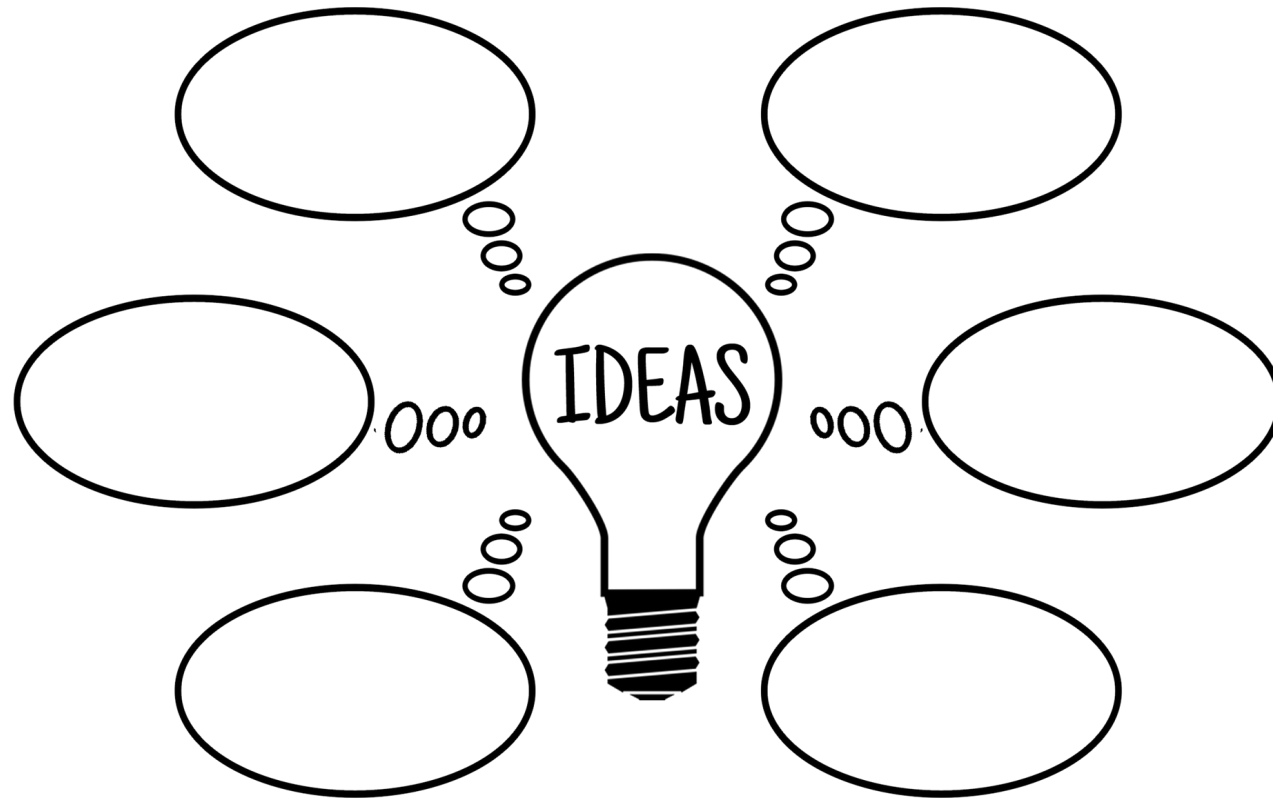
Add default seating configurations to the syllabus:

*This is an active class. Please be prepared to move your chairs in **Circle Configuration** or **Group Configuration**.*



# Work Arounds

Please write in the question box if you have some ideas to share.



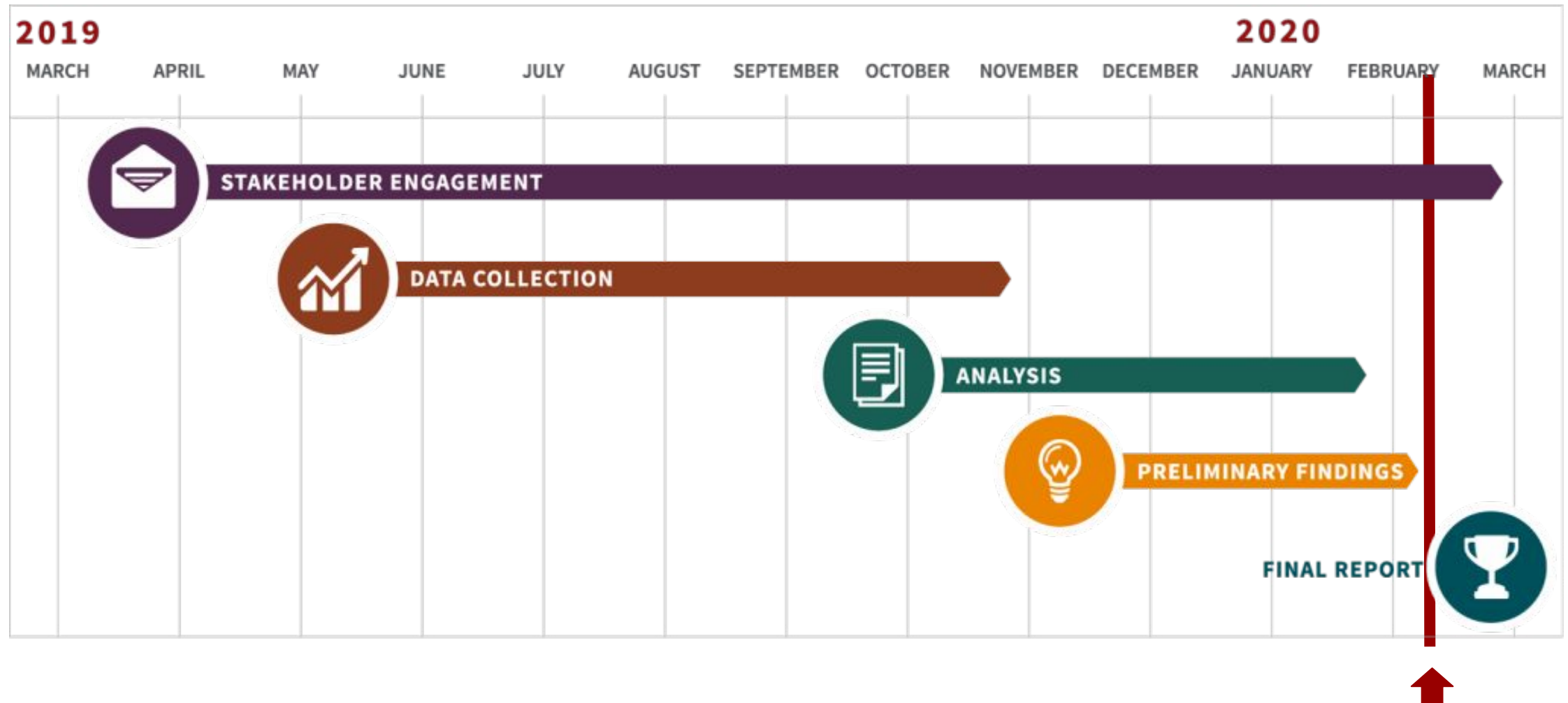


Advocating for active  
learning environments

Methods for  
Efficient  
& Effective  
Teaching











# Review: Learning objectives

Participants will be able to

- identify barriers and supports to active learning
- Identify workarounds for teaching in spaces that are not designed for active learning
- Apply the design principles to existing or new learning spaces
- Advocate for active learning spaces on campus



# Bibliography

Baepler, P., Walker, J., Brooks, D., Saichaie, K., & Petersen, C. (2016). A guide to teaching in active learning classrooms: History, research, and practice. Stylus.

Baepler, P., Walker, J., & Driessen, M. (2014). [It's not about seat time: Blending, flipping, and efficiency in active learning classrooms](#). Computers & Education, 78, 227-236.

Cheryan, S., Meltzoff, A.N., and Kim, S. (2011). Classrooms Matter: The Design of Virtual Classrooms Influences Gender Disparities in Computer Science Classes. Computers & Education 57: 1825–1835. doi:10.1016/j.compedu.2011.02.004.

Eddy, S.L., and Hogan, K.A. (2014). Getting under the hood: How and for whom does increasing course structure work? Life Science Education, 13, 453–468.

Finkelstein, A., Ferris, J., Winer, L. & Weston, C. (2014). Principles for designing teaching and learning spaces. Montreal: Teaching and Learning Services, McGill University. <https://www.mcgill.ca/tls/files/tls/principles-for-design-of-teaching-learning-spaces-2017.pdf>

Freeman, S., Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H., & Wenderoth, M. (2014). [Active learning increases student performance in science, engineering, and mathematics](#). Proceedings of the National Academy of Science, 111(23), 8410-8415.

Henderson, E., Testa, M.A., & Hartnick, C. (2011). Prevalence of noise-induced hearing-threshold shift and hearing loss among US youths. Pediatrics, 127, e39-e46. doi: 10.1542/peds.2010-0926

Larsen, J.B. & Blair, J.C. (2008). The effect of classroom amplification on the signal-to-noise ratio in classrooms while class is in session. Language, Speech, and Hearing Services in Schools, 39, 451-460. doi: 10.1044/0161-1461(2008/07-0032)

Lin, F. (2011). One in Five Americans Has Hearing Loss. Johns Hopkins Medicine. [https://www.hopkinsmedicine.org/news/media/releases/one\\_in\\_five\\_americans\\_has\\_hearing\\_loss](https://www.hopkinsmedicine.org/news/media/releases/one_in_five_americans_has_hearing_loss)

Master, A., Cheryan, S., Meltzoff, A. (2015). Computing Whether She Belongs: Stereotypes Undermine Girls' Interest and Sense of Belonging in Computer Science. *Journal of Educational Psychology*, 108:3, 424-437. <http://dx.doi.org/10.1037/edu000061>

Morrone, A., Flaming, A., Birdwell, T., Russell, J., Roman, T., & Jesse, M. (2017, December 4). [Creating active learning classrooms is not enough: Lessons from two case studies](#). EDUCAUSE Review.

Park, E. L., & Choi, B. K. (2014). [Transformation of classroom spaces: traditional versus active learning classroom in colleges](#). Higher Education, 68(5), 749–771.

Soneral, P. & Wyse, S. (2017). [A SCALE-UP mock-up: Comparison of student learning gains in high- and low-tech active-learning environments](#). CBE—Life Sciences Education, 16(1).

Stoltzfus, J., & Libarkin, J. (2016). [Does the room matter? Active learning in traditional and enhanced lecture spaces](#). CBE—Life Sciences Education, 15(4).

Whiteside, A., Brooks, D., Walker, J. (2010). [Making the case for space: Three years of empirical research on learning environments](#). EDUCAUSE Quarterly, 33.

# Thank you!

Questions?

Contact me at [helenchu@stanford.edu](mailto:helenchu@stanford.edu)



This work is licensed under [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Please cite as Chu, Helen Y., "Classroom Design for Active Learning." Summer Institutes on Scientific Teaching. February 19, 2020.

[https://works.bepress.com/helen\\_chu/](https://works.bepress.com/helen_chu/)