



# Diversity in MOOC Students' Backgrounds and Behaviors in Relationship to Performance in 6.002x

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# Rationale

- MOOC context allows for unprecedented level of diversity.
- This diversity has been shown to predict differential outcomes in residential and online learning.
- Data sources:
  - Online clickstream information
  - End-of-course survey

# Research Questions

- What is the variability in location and behavior surrounding site access and site use?
- For students who completed the exit survey, what is their prior exposure to the content, and what is their familiarity with teaching the content?
- For students who completed the exit survey, what are the reasons they cite for having taken part in the course?

# Variability in location



▶ TLL

Teaching  
& Learning  
Laboratory

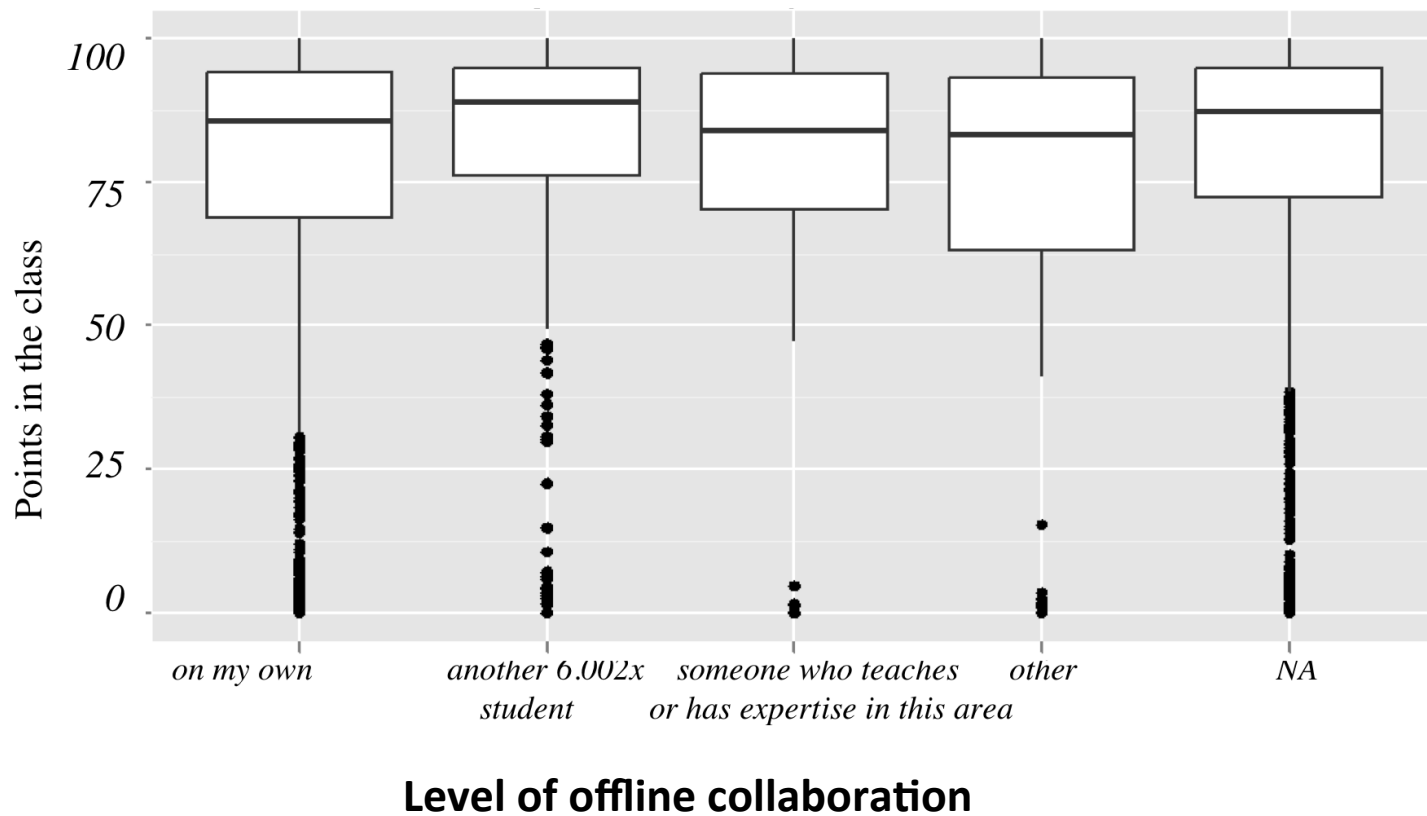
# Variability in location

Country	Registrants	Certificate earners	Country	Registrants	Certificate earners
United States	26309	1321	Spain	3684	535
India	13044	838	Mexico	2883	150
United Kingdom	8430	550	Canada	2834	162
Colombia	5955	458	Russian Federation	2029	195
Pakistan	4308	212	Poland	1392	187
Brazil	3852	190	Greece	1386	187

# Variability in offline collaboration

Working offline	Count	Percent of respondents to this question
I worked completely on my own	2359	75.71
I worked with another person who is also completing the course.	551	17.68
I worked with someone who teaches or has expertise in this area.	80	2.57
Other	126	4.04

# Variability in offline collaboration

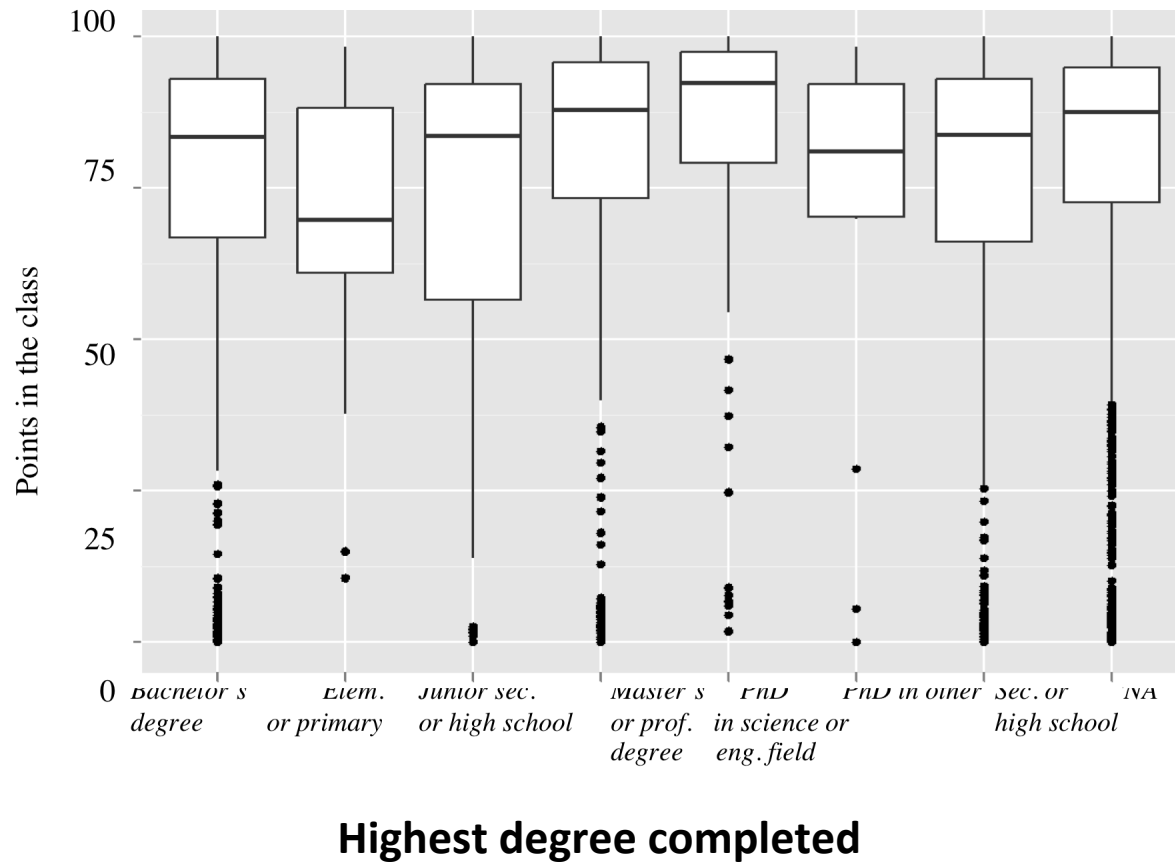


# Educational attainment

Degree level	Count	Percent of respondents to this question
Elementary/primary school	16	0.53
Junior secondary/high school	56	1.86
Secondary/high school	804	26.68
Bachelor's degree	1104	36.63
Master's or professional degree	840	27.87
PhD in a science or engineering field	178	5.91
PhD in another field	16	0.53



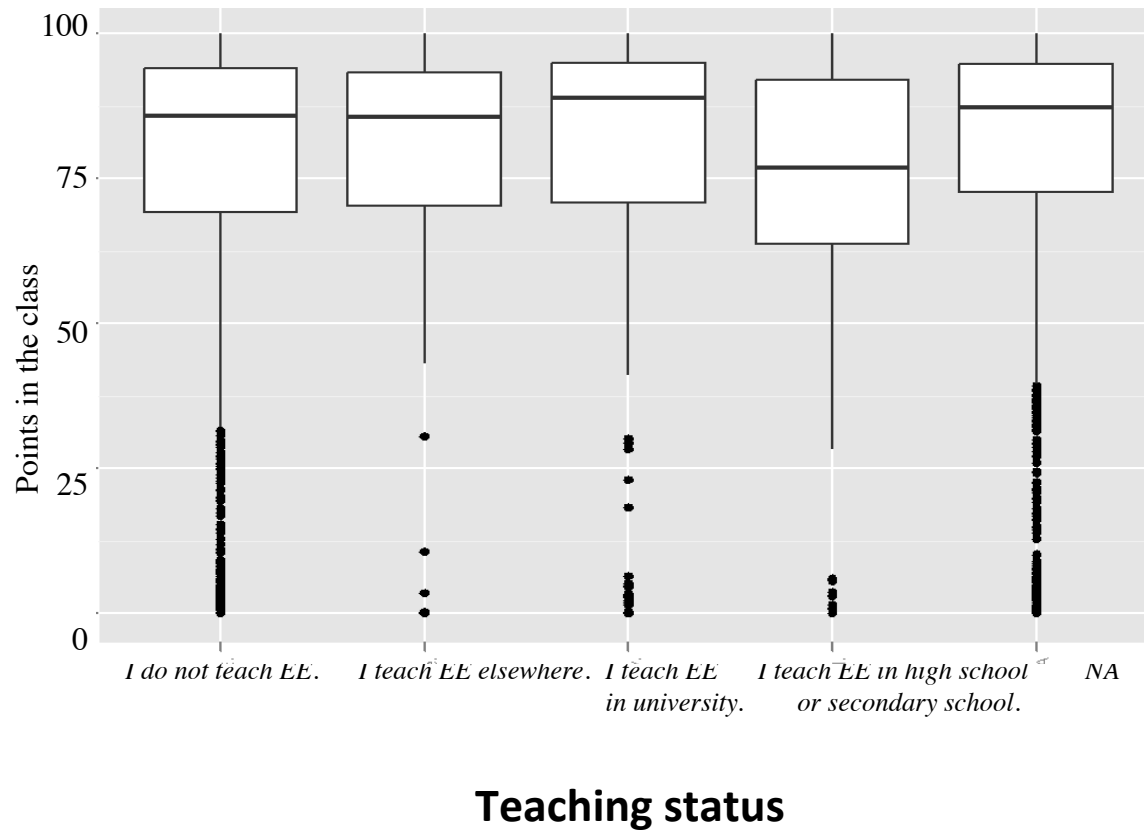
# Educational attainment



# Content familiarity

Teaching status	Count	Percent of respondents to this question
I do not teach EE.	2510	86.61
I teach EE elsewhere.	75	2.59
I teach EE in college/university.	255	8.80
I teach EE in high school/secondary level.	58	2.00

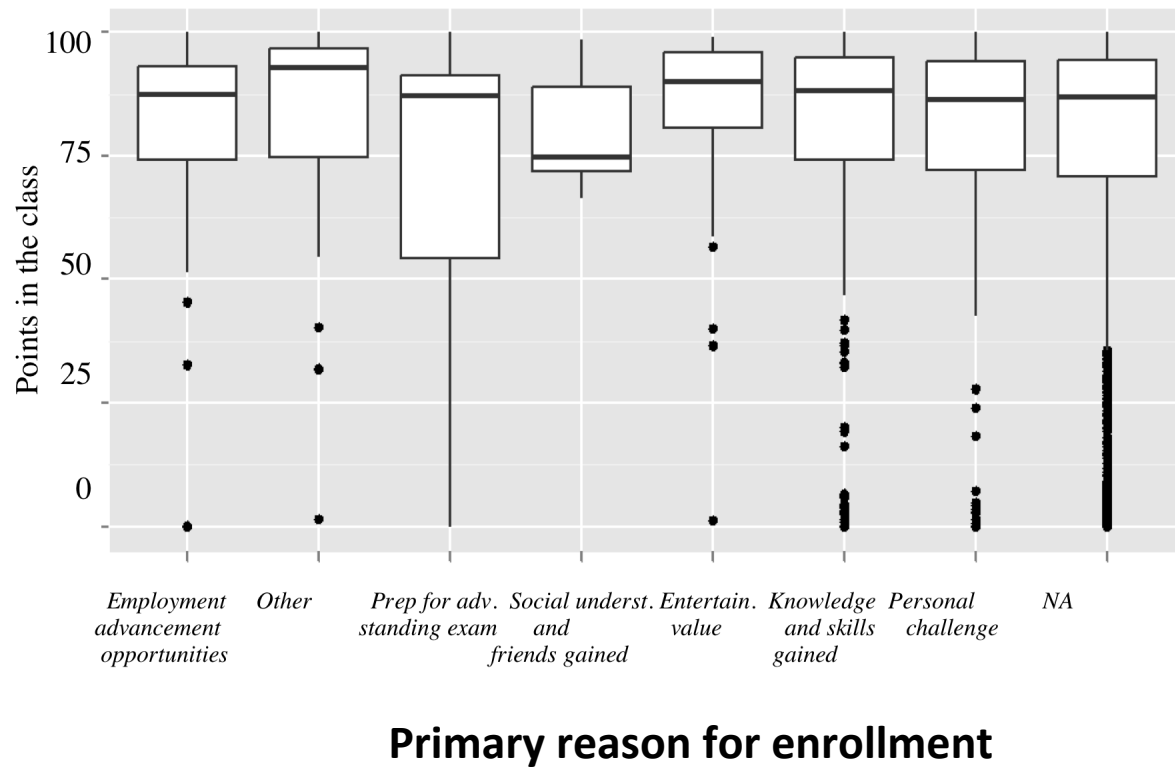
# Content familiarity



# Reason for enrollment

Reason given	Count	Percent of respondents to this question
Employment/job advancement opportunities	97	8.27
Other	40	3.41
Preparation for advanced standing exam	28	2.39
Social understanding and friends gained as a result of taking the course	5	0.43
The entertainment value of the course	53	4.52
The knowledge and skills gained as a result from taking the course	650	55.41
The personal challenge	300	25.58

# Reason for enrollment



# Implications

- Challenges of diverse classroom
- Prior educational experiences, collaboration matter for achievement
- Need to understand reason for enrollment, goals
  - May be useful resource for teachers
  - Different time allocations for different students
- Need further study of other MOOC instances to understand generalizability

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# References

- [1] Springer, L., Stanne, M. E., & Donovan, S. S. (1999). Effects of small-group learning on undergraduates in science, mathematics, engineering, and technology: A meta-analysis. *Review of Educational Research*, 69(1), 21–51.
- [2] Stump, G.S., Hilpert, J., Husman, J., Chung, W.T., & Kim, W. (2011). Collaborative learning in engineering students: Gender and achievement. *Journal of Engineering Education*, 100(3), 475-497.
- [3] Fredericks, C., Rayyan, S., Teodorescu, R., Balint, T., Seaton, D., & Pritchard, D.E. (2013). From Flipped to Open Instruction: The Mechanics Online Course. LINC 2013, Boston, MA.
- [4] Kizilcec, R.F., Piech, C., & Schneider, E. (2013). Deconstructing Disengagement: Analyzing Learner Subpopulations in Massive Open Online Courses. LAK'13 Leuven, Belgium.