

The Effects of Class Modality and Student Demographic on Academic Performance

Chris McMahan, Jun Park, and Kaylee McDaniel

Department of Economics, Humanities and Social Sciences, UNC

Teaching & Assessment Symposium Learning Session: Assessment Mini-Grant Talks

May 10, 2023

Introduction and Background

- From 2020-2021 the classroom environment was deeply affected by the pandemic as classes were moved online and into the hybrid format

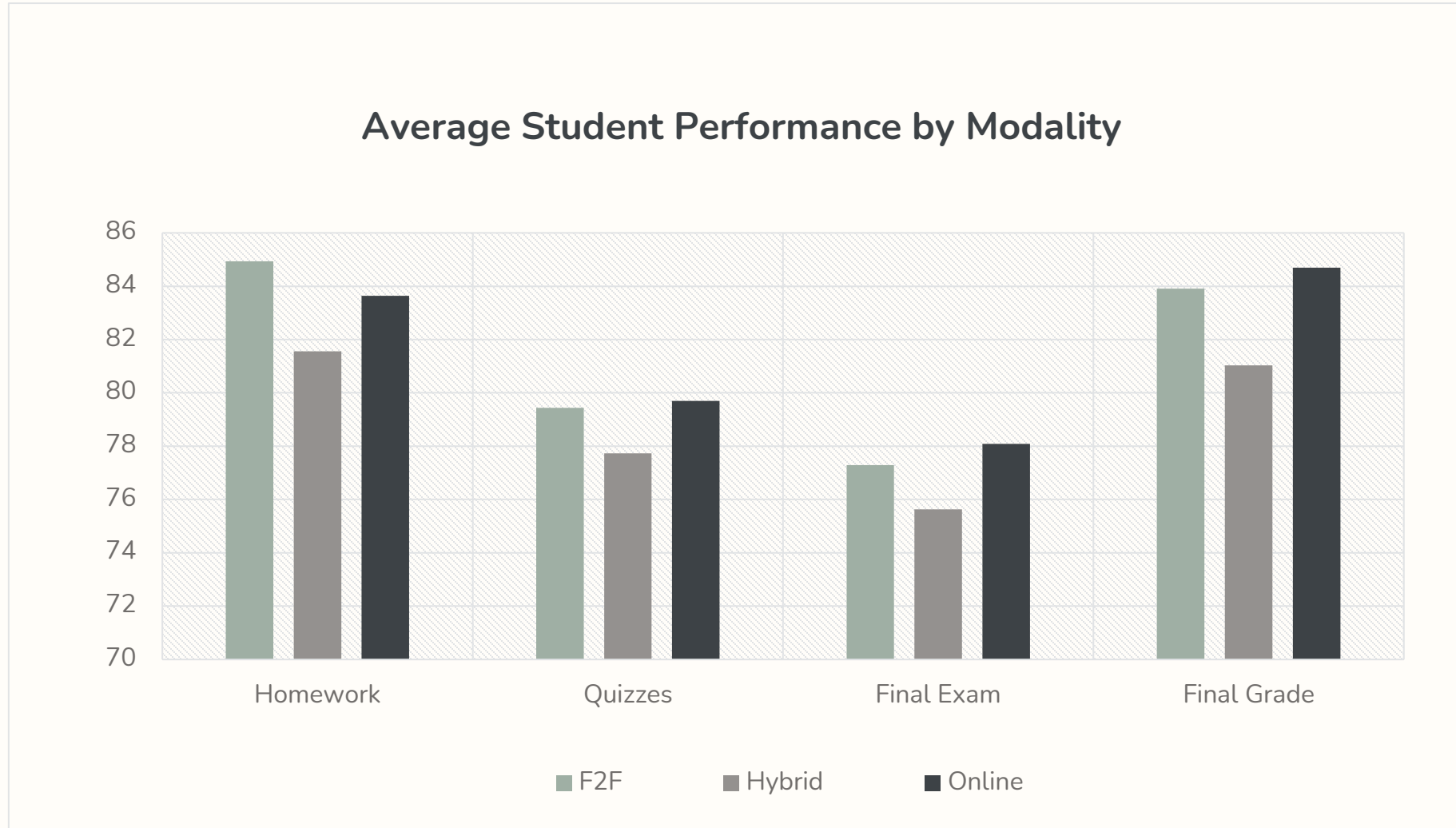
F2F – classes held in-person

Online – classes held fully online

Hybrid – classes split between online and in-person

- With the initiatives aligned with the *Rowing, Not Drifting 2030* strategic plan and the Students First Framework, UNC is now becoming a Hispanic Serving Institution (HSI) to support the student population including Hispanic/Latinx-identifying students in their academic success

Introduction and Background



Literature Review

Class modality affects student performance:

- F2F courses has elements that cannot be replicated in online courses. Students in vulnerable economic conditions tend to have a harder time in online courses due to lack of technology and environmental conditions (Gabriel, et al. 2022)
- Students in hybrid-online courses performed worse on exams and with their overall GPA then F2F courses when exams were held in person and discussion and instruction differed by modality (Galyon, et al. 2016)
- Students in online and hybrid courses perform just as well as students in F2F courses in an introductory accounting course. The student performance only differed on weekly assignments due to hybrid and online courses lacking discussions (Aly, 2013)

Literature Review and Research Question

Student demographics effects on student performance:

- High school academic achievement effects on student performance (Schmitt, et al. 2009)
 - SAT/ACT scores with high school GPA are valid predictors of students' undergraduate GPA
- Students from areas where families receive AFDC (Aid to Families with Dependent Children) and have lower proportions of residence with college degrees tend to have lower academic achievement (Bretts and Morell, 1999)

Research Question: Does Class Modality and Student Demographics Affect Student Performance?

Data

Upon approval through the UNC Institutional Review Board (IRB), we collected and analyzed two lower-division economics courses, *ECON 203: Principles of Macroeconomics* and *ECON 205: Principles of Microeconomics* (15 sections total, 5 sections each across modality - F2F, Online, and Hybrid) from Spring 2020, Summer 2020, Fall 2020, Spring 2021, Summer 2021, and Fall 2021

Number of Students by Modality:

Hybrid: 241 students
Online: 169 students
F2F: 303 students

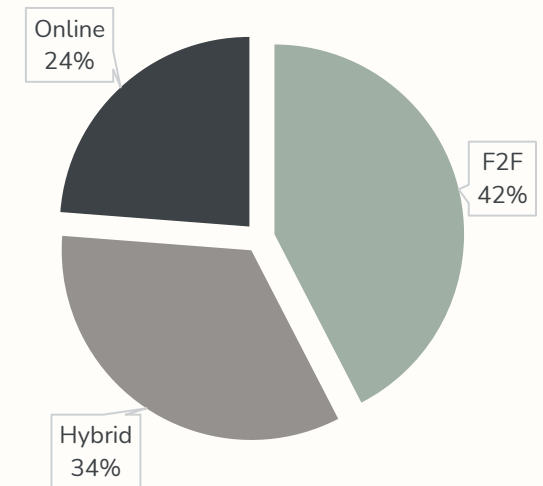
Number of Students by Semester:

Spring 2020: 248 students
Summer 2020: 11 students
Fall 2020: 235 students
Spring 2021: 148 students
Summer 2021: 16 students
Fall 2021: 55 students

15 classes in total:

6 Macroeconomics &
9 Microeconomics
5 classes of each modality
53 student average for fall and spring
14 student average for summer

Students by Modality:



Regression Model and Results

$$\begin{aligned} & Score_{iactm} \\ & = \beta_0 + \beta_1 Modality_m + \beta_2 Modality_m + \beta_3 Characteristics_i + \beta_4 Modality_m \times Characteristics_i \\ & + SemesterFE + CourseFE + AssignmentFE + \varepsilon_{iactm} \end{aligned}$$

Interpretations of preliminary results:

- Differences in between F2F and hybrid courses are insignificant, but **online scores** are about 1 percentage point **higher**
- **Male students** perform **slightly better** than female students overall, but that **difference disappears in online** courses
- **American Indian / Alaskan Native** students perform **significantly worse in hybrid and online** courses (5-10 percentage points)
- **First generation students** perform 2-3 percentage points **worse in online and hybrid** courses
- **Hispanic students** performed about 3 percentage points **better in online and hybrid** courses
- **Control variables** affect scores as **expected** (e.g. higher GPAs and more credits are correlated with higher scores)

Questions?

References

- Aly, I. M. (2013). A comparison of students' performance in an online introductory managerial accounting course with hybrid classroom setting. *Canadian Journal of Higher Education (1975)*, 43(2), 85-99. 10.47678/cjhe.v43i2.2474
- Betts, & Morell, D. (1999). The Determinants of Undergraduate Grade Point Average: The Relative Importance of Family Background, High School Resources, and Peer Group Effects. *The Journal of Human Resources*, 34(2), 268-293. 10.2307/146346
- Gabriel Lisboa de Melo, Brazaca, L. C., & Silva, L. F. (2022). Online teaching modality in a pandemic time: the opinion from a group of undergraduate physics students. *Revista Brasileira De Ensino De Física*, 4410.1590/1806-9126-rbef-2021-0431
- Galyon, C. E., Heaton, E. C. T., Best, T. L., & Williams, R. L. (2016). Comparison of group cohesion, class participation, and exam performance in live and online classes. *Social Psychology of Education*, 19(1), 61-76. 10.1007/s11218-015-9321-y
- Goldhaber, D., Kane, T. J., McEachin, A., Morton, E., Patterson, T., & Staiger, D. O. (2022). The Consequences of Remote and Hybrid Instruction During the Pandemic. Federal Reserve Bank of St Louis.
- Gratton-Lavoie, C., & Stanley, D. (2009). Teaching and learning principles of microeconomics online: An empirical assessment. *The Journal of Economic Education*, 40(1), 3-25. 10.3200/JECE.40.1.003-025

References

- Jansa, J. M., & Ringsmuth, E. M. (2022). The Impact of Course Structure on Students' Political Efficacy and Confidence-in-Knowledge in Introduction to American Government. *Journal of Political Science Education*, 18(4), 455-475. 10.1080/15512169.2022.2097916
- Kelani, Z., Doral, M., & Post, Y. R. (2021). Academic Performance of Face-to-Face and Online Students in an Introductory Economics Course and Determinants of Final Course Grades. *Online Journal of Distance Learning Administration*, 24(2)
- Millea, M., Wills, Elder, & Molina. (2018). What Matters in College Student Success? Determinants of College Retention and Graduation Rates. *Education (Chula Vista)*, 138(4), 309-322.
- Rabideau, M., & Starnes, A. (2022). Investigating the Relationships Between SAT Scores, High School GPA, Undergraduate Precalculus Grade, and Calculus Grade. *PRIMUS : Problems, Resources, and Issues in Mathematics Undergraduate Studies, ahead-of-print(ahead-of-print)*, 1-14. 10.1080/10511970.2022.2122646
- Schmitt, N., Keeney, J., Oswald, F. L., Pleskac, T. J., Q. Billington, A., Sinha, R., & Zorzie, M. (2009). Prediction of 4-Year College Student Performance Using Cognitive and Noncognitive Predictors and the Impact on Demographic Status of Admitted Students. *Journal of Applied Psychology*, 94(6), 1479-1497. 10.1037/a0016810