Measuring the Effect of Blended Learning: Evidence from a Selective Liberal Arts College

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Online Appendix

Complete Regression Results

Due to space constraints, we did not include all of the regression covariates in the manuscript. We show the full table of results below.

Additional Variable Descriptions

Carleton College allows students to report either SAT or ACT scores in their admission file. For comparability, we created a Standardized Test Percentile variable by converting test scores into percentiles and taking the mean percentile across the different reported standardized tests for each student. Percentile data was obtained from `https://secure-media.collegeboard.org/digitalServices/pdf/sat/sat-percentile-ranks-crit-reading-math-writing-2014.pdf` and `http://www.actstudent.org/scores/norms1.html`.

We also collected a financial need variable from our Admissions Office. Each student is designated as one of five need categories. The highest need group was determined to have financial need greater than three-quarters of the comprehensive fee at Carleton College ($60,102 for the 2014-15 academic year). The second highest need group had need greater than half of the comprehensive fee. The third (fourth) highest need categories had need greater than one fourth (zero) of the comprehensive fee. The final group was determined to have no financial need or did not apply for aid. Financial need is bimodally distributed. Approximately half of students received no financial aid, while one quarter of the students were in the highest need category (the remaining quarter of students is distributed across the remaining three aid categories).

Covariates by Subgroups

Because our study is observational, we tested for differences in student characteristics across the control and treatment class sections (Tables 2 and 3) as well as those students who opted out of the study vs those that participated (Tables 4 and 5). No statistically significant differences were found across these groups with the exception of participation by gender. Males were significantly more likely to opt out of the study than females.

Table 1: Full Regression Results

	Dependent variable:					
	Δ TUCE= Posttest - Pretest			Δ TUCE/(30 - Pretest)		
	(1)	(2)	(3)	(4)	(5)	(6)
Blended Treatment: Yes	1.92***	1.74***	1.82***	0.09**	0.08*	0.08*
	(0.62)	(0.61)	(0.64)	(0.04)	(0.04)	(0.04)
Difference in Effort		0.06	0.09		0.003	0.01
		(0.10)	(0.10)		(0.01)	(0.01)
Difference in Importance		0.17*	0.12		0.01	0.01
		(0.09)	(0.09)		(0.01)	(0.01)
Completed College Macro			−0.12			−0.01
			(0.69)			(0.05)
Completed HS Macro			−0.10			0.05
			(1.04)			(0.07)
Completed HS Micro			−0.59			−0.003
			(1.33)			(0.09)
Stand. Test Percentile			−0.07			0.0001
			(0.05)			(0.003)
Year of College			0.05			−0.02
			(0.38)			(0.03)
Male: Yes			−0.69			−0.04
			(0.63)			(0.04)
Minority or Int'l Student			−1.10			−0.08*
			(0.70)			(0.05)
Financial Need: Low			0.30			−0.01
			(1.37)			(0.09)
Financial Need: Some			−1.69			−0.11
			(1.07)			(0.07)
Financial Need: More			−2.31**			−0.15**
			(1.02)			(0.07)
Financial Need: Most			−0.84			−0.04
			(0.78)			(0.05)
Constant	4.34***	4.34***	11.38	0.31***	0.31***	0.75
	(0.49)	(0.48)	(7.92)	(0.03)	(0.03)	(0.54)
Observations	150	149	149	150	149	149
R^2	0.06	0.09	0.18	0.03	0.05	0.13
Adjusted R^2	0.05	0.07	0.09	0.02	0.03	0.04

Table 2: Demographic Statistics by Class Sections

variable	group	n	mean	sd	median	min	max
Standardized Test Percentile	Control	91	94.1	6.6	95.5	57	99
	Treatment	102	93.1	7.3	95.8	56	99
SAT Math	Control	54	727.4	58.0	740	600	800
	Treatment	71	713.2	65.5	720	500	800
SAT Verbal	Control	54	696.1	70.8	695	400	800
	Treatment	71	694.2	67.5	700	500	800
ACT Composite	Control	49	31.6	2.6	32	23	36
	Treatment	52	31	2.8	31.5	21	35
HS Macro (Yes = 1)	Control	91	0.1	0.4	0	0	1
	Treatment	102	0.1	0.3	0	0	1
HS Micro (Yes = 1)	Control	91	0.1	0.3	0	0	1
	Treatment	102	0.1	0.2	0	0	1
College Macro (Yes = 1)	Control	91	0.4	0.5	0	0	1
	Treatment	102	0.4	0.5	0	0	1
Exp. College Grad Year	Control	91	17.5	0.8	18	15	18
	Treatment	102	17.4	0.9	18	15	19
Gender (Male = 1)	Control	91	0.6	0.5	1	0	1
	Treatment	102	0.6	0.5	1	0	1
Minority or Intl Student	Control	91	0.4	0.5	0	0	1
	Treatment	102	0.3	0.5	0	0	1

Table 3: Frequency of Student Financial Need by Class Section

	No Need	Lowest Need	Some Need	More Need	Most Need
Control Sections	42	7	6	13	23
Treatment Sections	51	2	11	11	27

Table 4: Student Demographic Statistics by Participation Decision

variable	group	n	mean	sd	median	min	max
Standardized Test Percentile	In Study	150	93.3	6.8	95.5	57	99
	Opted Out	43	94.4	7.4	96.5	56	99
SAT Math	In Study	104	718.5	64.3	740	500	800
	Opted Out	21	723.8	54.2	720	600	800
SAT Verbal	In Study	104	694.7	69.2	705	400	800
	Opted Out	21	696.7	67.2	690	570	800
ACT Composite	In Study	72	31.1	2.7	31	23	36
	Opted Out	29	31.8	2.7	32	21	35
HS Macro (Yes = 1)	In Study	150	0.1	0.3	0	0	1
	Opted Out	43	0.1	0.4	0	0	1
HS Micro (Yes = 1)	In Study	150	0.1	0.3	0	0	1
	Opted Out	43	0.1	0.3	0	0	1
College Macro (Yes = 1)	In Study	150	0.4	0.5	0	0	1
	Opted Out	43	0.5	0.5	1	0	1
Exp. College Grad Year	In Study	150	17.4	0.9	18	15	18
	Opted Out	43	17.4	0.9	18	15	19
Gender (Male = 1)	In Study	150	0.5	0.5	1	0	1
	Opted Out	43	0.8	0.4	1	0	1
Minority or Intl Student	In Study	150	0.4	0.5	0	0	1
	Opted Out	43	0.3	0.4	0	0	1

Table 5: Frequency of Student Financial Need by Study Participation Decision

	No Need	Low Need	Some Need	More Need	Most Need
In Study	73	8	14	17	38
Opted Out	20	1	3	7	12