UNIVERSITY SYSTEM OF GEORGIA
Research and Policy Analysis

Research and Policy Brief

Graduate Course Outcomes by Modality: Online versus Face-to-Face

January 16, 2024

Primary Contact: Lori Hagood (Lori.Hagood@usg.edu) and Pearson Brown (Pearson.Brown@usg.edu)

This analysis examines the differences in graduate course outcomes between online and face-to-face courses in Spring 2022 by 2-digit CIP code (i.e., academic area) and course section. The key outcomes explored are course GPA[1], percent of As awarded, pass rate (grade of C or better, including S), and DFW rate (percent of Ds, Fs, Ws, and WFs awarded). Outcomes in online courses are compared to outcomes in face-to-face courses at the same institution (unless otherwise noted). Methods include descriptive analysis and paired t-tests.

Data Considerations

This analysis uses course grade data in graduate level courses (course number ≥ 5000) during Spring 2022. A course is regarded as being online when 95 percent or more of the course's content is delivered via the internet. Since graduate level courses are often unique to their institution, this analysis primarily centers differences in outcomes across academic areas, based on 2-digit CIP code. Specifically, this analysis focuses on the eight academic areas at each institution, sector, and system-wide that have the highest online enrollment. Courses that were graded on a pass/fail basis are excluded and students who withdrew from a course are removed from all outcomes calculations except for a course's DFW rate.

It is important to note that when compared to undergraduate courses, courses at the graduate level are less frequently offered in both an online and face-to-face format. At the institution level, 10 institutions had less than eight academic areas that had an online course at the graduate level[2] and six institutions had an academic area in their top eight where the online course and/or its face-to-face counterpart had less than 10 students. In terms of course level outcomes, six institutions offered less than eight online courses and there were 10 institutions that had at least one online course where the face-to-face section had less than 10 students.

Summary of Findings

In the descriptive analysis comparing outcomes between online and face-to-face courses, students appear to perform better in face-to-face courses. Though in some cases, online sections outperform face-to-face sections. In seven of the eight academic areas with the greatest online enrollment, as well as in five of the eight courses with the greatest online enrollment, students in face-to-face sections had a higher course GPA than their peers in the online section. Students in face-to-face sections also had a higher pass rate than their peers in the online section for each of the eight courses and in six of the eight academic areas with the greatest online enrollment. Students in face-to-face sections in the research university sector typically outperform their counterparts in the online section, though outcomes are split more evenly at the comprehensive and state university level.

The results of the t-tests, which allow us to summarize the difference in outcomes while only comparing the same course at the same institution, suggest that there is rarely a significant difference in

[1] Course GPA = (4*number of As + 3*number of Bs + 2*number of Cs + 1*number of Ds)/total students enrolled, excluding students who withdrew from the course

[2] Two universities were removed for not having any course pairs with an online and face-to-face format

pass rates; no academic area had a statistically significant difference in pass rate and Columbus State University was the only institution where the difference was statistically significant.

An accompanying data file that provides descriptive comparisons between online and face-to-face course sections for the eight academic areas and courses that have the highest online enrollment system-wide as well as for each sector and institution is available upon request.

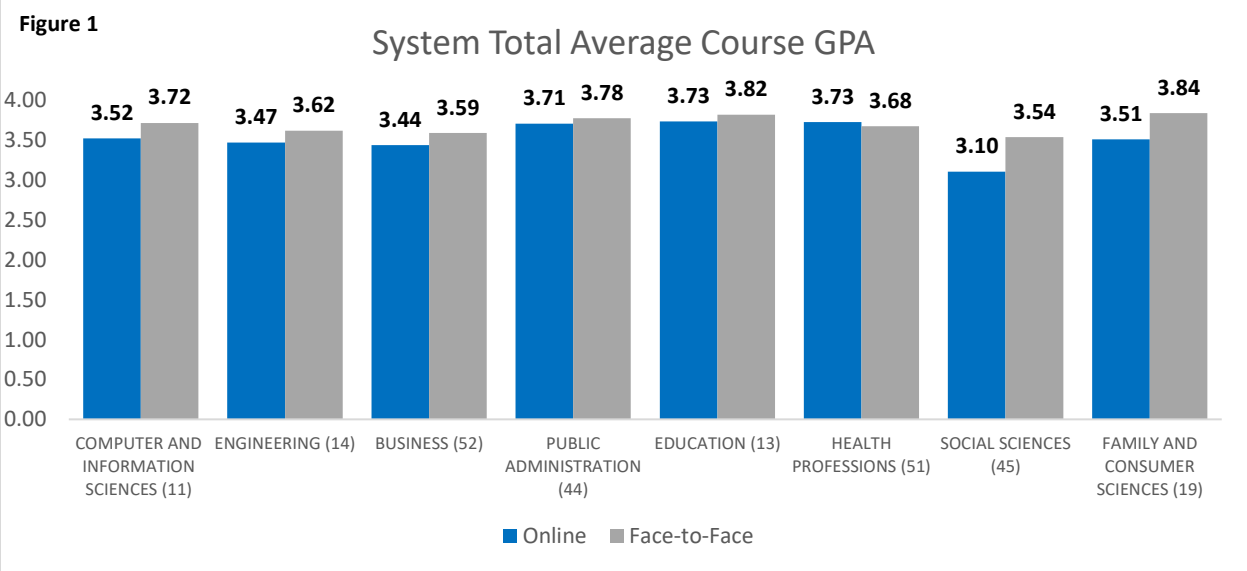
Descriptive Analysis

System Summary: Academic Area

At the system level, across the eight academic areas with the highest online enrollment, students in the face-to-face section tend to outperform their online counterparts. The system level outcomes and corresponding charts are discussed below[3] and are summarized in Table 1. Note: for the system-level descriptive analysis, comparisons are made for the same academic area but not necessarily at the same institution.

Of the system's top eight academic areas, seven academic areas had a higher course GPA in the face-to-face version compared to its online counterpart: computer and information sciences, engineering, business, public administration, education, social sciences, and family and consumer sciences (see Figure 1). In these seven academic areas, the difference in average course GPA was relatively small, ranging from .07 to .44. Health professions was the only academic area within the system's top eight online enrollments where students in the online section had a higher course GPA compared to their face-to-face counterparts (3.73 vs. 3.68, respectively).

Figure 1

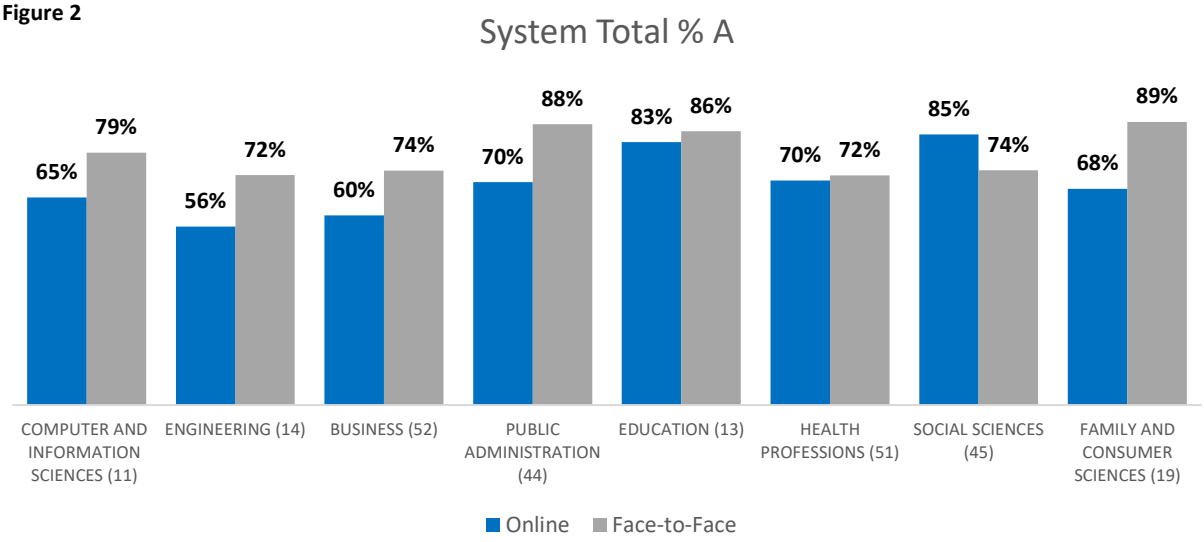


Seven academic areas had a higher percent of As awarded in face-to-face sections compared to online sections (see Figure 2). The percentage of face-to-face students who received As was around 15 percentage points higher than the percentage of online students who received As in computer and information sciences, engineering, business, public administration and family and consumer sciences. Social sciences was the only academic area within the system's top eight online enrollments where

[3] 2-digit CIP codes are shown in the parentheses

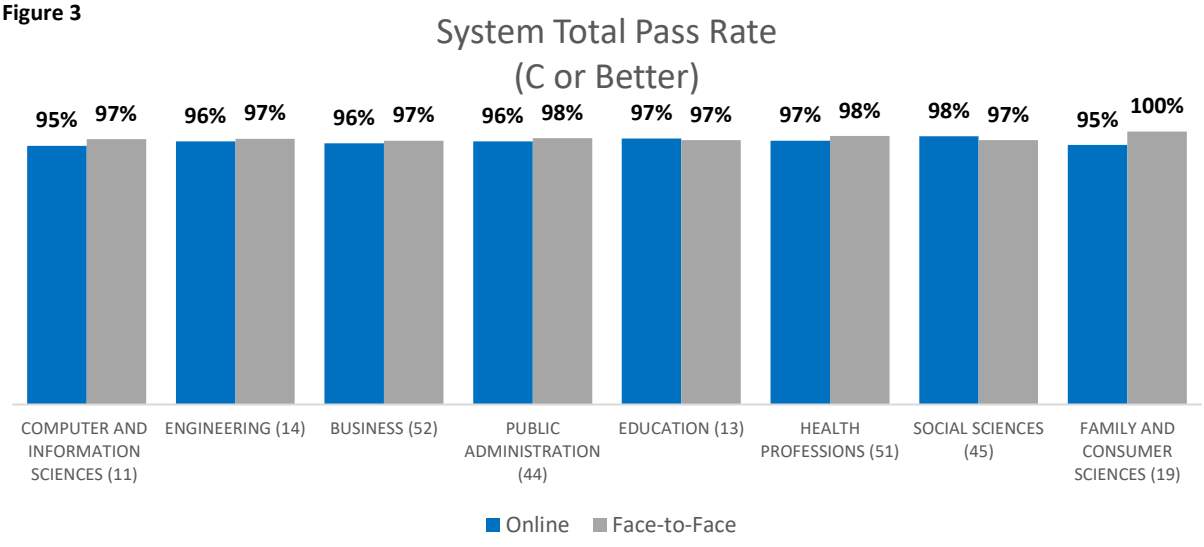
students in the online section earned As at a higher rate than their face-to-face counterparts (85% vs. 74%, respectively).

Figure 2



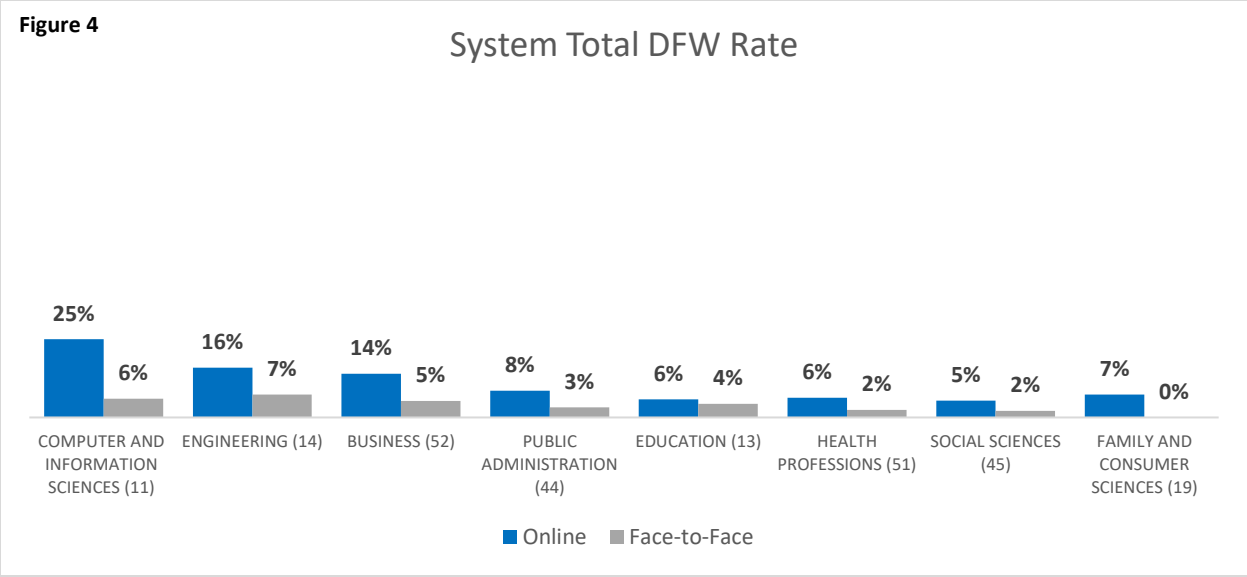
Six academic areas had a higher pass rate in face-to-face sections compared to online sections (see Figure 3). Differences in pass rate were usually within two percentage points. Online students in education and social sciences had marginally higher pass rates than their face-to-face counterparts.

Figure 3



The DFW rate was higher in the online sections compared to the face-to-face sections for each of the top eight academic areas (see Figure 4). The largest difference was for computer and information sciences where the DFW rate was 25 percent in online sections compared to six percent in face-to-face sections.

Figure 4



Business and computer and information sciences are the two academic areas that are in each sector's top online enrollments. The system level and research university sector have the same top eight academic areas with the highest online enrollments, though the order slightly varies. The state university sector only offers online courses in five academic areas.

Paired T-Tests

The paired t-tests allow us to compare pass rates for online and face-to-face courses by academic area and by USG institution. Moreover, the results of this test are used to determine whether the difference in outcomes is statistically significant. This analysis includes all academic areas, based on 2-digit CIP code, and USG institutions with at least one graduate-level course offered in both an online and face-to-face format. The t-tests are limited to pass rates since pass rates are the most applicable at the graduate-level.

Paired T-Test by Academic Area

The paired t-test results indicate that there are no statistically significant differences in pass rate between online and face-to-face courses in the same academic area (see Table 2). This suggests that across academic areas, students perform similarly whether they take a course in an online or in a face-to-face format. These results are consistent with the small differences in outcomes presented above.

Paired T-Test by Institution

Columbus State University was the only institution where graduate students had a statistically significant difference outcomes; graduate students at Columbus State University in face-to-face sections had a statistically significant higher pass rate ($p < .05$) compared to their online counterparts (see Table 3). The difference in outcomes at Columbus State University can likely be explained by students in computer and information sciences classes having a better pass rate in face-to-face courses compared to online courses (100% vs. 92%, respectively).

Table 1

Online v. Face-to-Face: Grades in Eight Academic Areas with Highest Online Enrollment Spring 2022

System Total

	Online						Face-to-Face					
2 Digit CIP Code	Total Enrolled	Av. Class Size	Av. Course GPA	% A	Pass Rate (C or better)	DFW Rate	Total Enrolled	Av. Class Size	Av. Course GPA	% A	Pass Rate (C or better)	DFW Rate
11	9,724	97	3.52	65%	95%	25%	3,080	15	3.72	79%	97%	6%
14	3,298	35	3.47	56%	96%	16%	2,407	19	3.62	72%	97%	7%
52	1,809	50	3.44	60%	96%	14%	1,271	24	3.59	74%	97%	5%
44	674	24	3.71	70%	96%	8%	625	16	3.78	88%	98%	3%
13	612	12	3.73	83%	97%	6%	535	10	3.82	86%	97%	4%
51	359	16	3.73	70%	97%	6%	247	12	3.68	72%	98%	2%
45	345	31	3.10	85%	98%	5%	95	14	3.54	74%	97%	2%
19	81	16	3.51	68%	95%	7%	63	13	3.84	89%	100%	0%

Notes: Course GPA = (4*number of As + 3*number of Bs + 2*number of Cs + 1*number of Ds) / Total students enrolled, excluding students who withdrew from the course

Other Grades = K, NR, O, U, V

2-Digit CIP Codes: Computer and Information Sciences (11); Engineering (14); Business (52); Public Administration (44); Education (13); Health Professions (51); Social Sciences (45); Family and Consumer Sciences (19).

Table 2

Pass Rate: Online versus Face-to-Face
Paired T-test Results by Academic Area (2-digit CIP)

Academic Area	# of Course Pairs	Online Pass Rate	Face-to-Face Pass Rate	Difference	t	Significance
Computer and Information Sciences (11)	73	0.95	0.95	0.00	-0.092	
Education (13)	32	0.97	0.98	0.00	-0.340	
Engineering (14)	68	0.97	0.96	0.01	0.835	
Family and Consumer Sciences/Human Sciences (19)	5	0.95	1.00	-0.05	-1.393	
Legal Professions (22)	2	1.00	0.99	0.01	1.000	
Biological and Biomedical Sciences (26)	6	1.00	0.94	0.06	1.285	
Mathematics and Statistics (27)	2	1.00	0.98	0.02	1.000	
Psychology (42)	8	1.00	0.96	0.04	1.507	
Security and Protective Services (43)	3	0.95	0.97	-0.02	-1.327	
Public Administration (44)	18	0.97	0.99	-0.02	-1.965	
Social Sciences (45)	7	0.82	0.93	-0.11	-0.867	
Health Professions (51)	19	0.99	0.97	0.01	0.547	
Business (52)	27	0.96	0.96	0.00	-0.044	
History (54)	3	1.00	0.91	0.09	1.926	
System Total	**285**	**0.96**	**0.96**	**0.00**	**0.172**	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The following academic areas each had pass rates of 100% for their online and face-to-face course pairs or only one course pair and are therefore not shown: Natural Resources and Conservation (3), Area, Ethnic, Cultural, and Gender Studies (5), Communications, Journalism, and Related Programs (9), English Language and Literature/Letters (23), Liberal Arts and Sciences (24), Multi/Interdisciplinary Studies (30), Philosophy and Religious Studies (38), Physical Sciences (40), and Visual and Performing Arts (50).

Table 3

Pass Rate: Online versus Face-to-Face
Paired T-test Results for the Eight Academic Areas with the Highest Online Enrollments

Institution	# of Course Pairs	Online Pass Rate	Face-to-Face Pass Rate	Difference	t	Significance
Albany State University	3	0.83	0.83	0.00	0.004	
Clayton State University	3	0.94	0.90	0.04	1.984	
Columbus State University	11	0.94	1.00	-0.05	-2.462	*
Fort Valley State University	5	0.91	0.98	-0.08	-1.478	
Georgia College & State University	3	1.00	0.96	0.04	1.947	
Georgia Institute of Technology	103	0.96	0.96	0.00	-0.027	
Georgia Southern University	12	0.99	0.95	0.04	1.263	
Georgia State University	50	0.96	0.98	-0.03	-1.707	
Kennesaw State University	43	0.97	0.94	0.03	1.232	
University of Georgia	27	0.98	0.97	0.00	0.283	
University of West Georgia	8	1.00	0.90	0.09	2.270	
Valdosta State University	10	0.95	0.98	-0.03	-1.051	
System Total	**285**	**0.96**	**0.96**	**0.00**	**0.172**	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

August University and the University of North Georgia each had pass rates of 100% across their online and face-to-face course pairs are therefore not shown.