

The Return Journey: A Multivariate Analysis of Covid-19 Related Academic Pitfalls in Post-Secondary Business Education

Derek Ezell
University of Tennessee at Martin

Patrick Bishop
University of Tennessee at Martin

Sean Walker
University of Tennessee at Martin

Online instruction is not new and has not been such for over two decades. Despite this, it still presents challenges for faculty and students alike. Specifically, many faculty and students avoid online instruction because it does not fit their teaching or learning styles. A problem then occurs when this instructional methodology cannot be avoided. The current work looks at online instruction from before, during, and after COVID-19 (i.e., when faculty and students were not necessarily given a choice on the delivery of instruction) to assess any instructional quality gaps during this period. The results significantly impact a student's classroom performance (i.e., grades earned) based on several factors. Results and future research are discussed.

Keywords: scholarship of teaching and learning, online instruction, COVID-19

INTRODUCTION

With online instruction gaining momentum over the past decade, subsequent research concerning its effectiveness has also increased (Fish & Gill, 2009). Prior to the COVID-19 pandemic, most instructors had a choice whether to engage in online instruction or not, and research focused mostly on the effectiveness of online instruction and best practices to increase this effectiveness (Crawford-Ferre & Wiest, 2012). However, the pandemic forced many instructors who weren't fully prepared for such a transition to engage in online instruction. Recent research shows the increased success rates of online instruction after the instructor has gone through an appropriate professional development program (Borup & Evmenova, 2019).

Research has shown a need for faculty members to foster and develop skills delivering instruction in a manner that is adaptive to the needs of the students. Rischin (2002) noted that to be an effective teacher, students' different learning styles would require different instruction methods to be delivered by the instructor. Lang, McKee, and Conner (1993) discussed the need for instruction (and instructors) to be organized and flexible. Dowling, Godfrey, and Styles (2003) found that flexibility was particularly important for accounting students. Still yet simply being flexible is not enough, as it is likely that students

will be aware of *rough transitions* from faculty who are not adept at such instruction. While not directly addressing the need for repetition of instruction, research (e.g., Telford, 1995; Thomas, 1995) have discussed how the desired flexibility/adaptability of instruction may have negative consequences for classroom instruction. This is useful because it helps to understand because it highlights the likelihood of an instructional quality gap between instructors who commonly deliver online instruction and those who don't.

Research has shown that perceived effectiveness of online instruction increases among faculty as those individuals gain more experience as they become more familiar with the teaching method (Fish & Gill, 2009). With COVID-19 forcing many instructors to teach online who had little to no intentions of ever teaching online, it's easy to see how the effectiveness of this instruction could be hindered. While several schools attempted to quickly train these instructors on the best practices for online instruction, many were still ill-prepared. Fortunately for instructors, most factors determining a successful course are consistent regardless of the nature of the course offering (face-to-face vs. online). For example, students, regardless of major, are likely to be focused on receiving clear and specific assignment instructions (e.g., Hewson et al., 2001), learning material that is easier to follow (e.g., Rivera and Rice, 2002), and those that minimize learning gaps (i.e., from technology) or disruptions (Webster and Hackley, 1997). The factors that are different based on the course offering, although few, can have a big impact on the quality of the course (Lockman & Schirmer, 2020).

Even though the factors for ultimate student success were in place during the pandemic, the degree of effectiveness remains a matter of debate and of research. This study attempts to add elements relevant to the analysis of the question of teaching effectiveness during the global quarantine with an eye toward providing tools to develop future methodologies aimed at counteracting any similar teaching issues and challenges in the future.

Both students and faculty were required to participate in an unprecedented academic change that was made more difficult for both based on the rapidity of that change and the degree of change in instructional methodologies. An extremely quickly evolving scenario necessitated an equally extremely divergent method of teaching and learning to be adopted. Students and faculty went from in-classroom instruction to remote instruction, sometimes within days or even hours, with all the associated changes being employed in a comparatively impromptu fashion. In many cases, no additional resources were available beyond the typical technology required for online learning; sometimes, even that was unavailable to students. Laptops, tablets, and stable internet connections were not a given for all involved in these rapid changes. Issues of fairness, equitable treatment, and privacy were raised regarding the mandated use of webcams. There was, and is, a great deal of uncertainty about the validity of measures taken to promote successful teaching interactions between students and faculty.

This research looks at the success rate of business students at a southeastern regional school before, during, and after the pandemic. The focus is to provide some preliminary information for academics (scholars and practitioners) as to whether there was an experienced instructional quality gap because of the pandemic and its requirement of instruction to move online. This study attempts to gather data relating to discrepancies in student performance based on several key variables discussed below. This research does not attempt to formulate any hypotheses because of the need to have an open mind and reduce the likelihood of preconceived notions when analyzing the findings. As such, the current research does follow the current Research Questions.

Research Question 1: Will the shift to online instruction because of the COVID-19 pandemic, significantly impact instructional quality?

Research Question 2: What available and measurable factors will significantly impact instructional quality?

METHODOLOGY

Sample

Undergraduate business students in a medium-sized university in the mid-south of the United States were used in the current study. Nine thousand three hundred and sixty-nine students were included in the analysis. This sample represents all grades earned on an online business course between Fall 2018 and Fall 2022.

Analysis

The focus of the current research was to measure whether the pandemic had a significant impact on online instruction. Specifically, were the grades received by students significantly different before (Fall 2018-Fall 2019), during (Fall 2020, Spring 2021, and Fall 2021), and after (Fall 2022) the pandemic protocols? Additionally, it was decided to parse out two other *conditions* as these periods may present a significant difference in grades earned, and not for the reasons we were attempting to measure (Spring 2020 and Summer terms). Spring 2020 presented nuances to the instruction (and grading) since many schools shifted on-campus courses to online before the semester was complete. Summer terms comprised mainly courses taught by instructors who had previously taught (and designed) summer courses as well as students who typically *opt-in* to take online courses during that term. This suggests that there may be fruitful differences by not including these periods in the other conditions.

Variables

The data utilized in the study came from the institution's unit of *Institutional Research* and, as secondhand data, was mined as such. The independent variables for the analysis were TermCoded (Block 1), DepartmentCoded (Block 2), and Race (Block 3). The dependent variables for the analysis were A count, B count, C count, D count, F count, I count, W count, Pass count, DWFI count, Final Grade, and GPA. Each variable labeled *count* was determined by the number of students who earned or did not earn the respective grade/category. GPA was calculated as the gpa for each respective course section included in the analysis.

RESULTS

All available demographics (i.e., race, gender, etc.) were included in the initial analysis for each dependent variable. All demographics except Race were insignificant and therefore removed from further analysis.

A Count

Logistic regression was used to analyze the relationship between Term, Department, and Race with A count. There was a statistically significant effect for all three predictor variables entered into the model as shown in Table 1.

TABLE 1
A COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
TermCoded	.092	.016	31.937	1	<.001	1.096
DepartmentCoded	.330	.042	62.064	1	<.001	1.391
Race	-.059	.020	8.541	1	.003	.943

B Count

Logistic regression was used to analyze the relationship between Term, Department, and Race with B count. There was a statistically significant effect for all three predictor variables entered into the model as shown in Table 2.

TABLE 2
B COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
TermCoded	-.042	.019	4.858	1	.028	.959
DepartmentCoded	.239	.049	23.694	1	<.001	1.270
Race	-.059	.025	5.707	1	.017	.942

C Count

Logistic regression was used to analyze the relationship between Term, Department, and Race with C count. There was a statistically significant effect for TermCoded as shown in Table 3.

TABLE 3
C COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
TermCoded	-.057	.026	4.983	1	.026	.945

D Count

Logistic regression was used to analyze the relationship between Term, Department, and Race with D count. There was a statistically significant effect for DepartmentCoded as shown in Table 4.

TABLE 4
D COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
DepartmentCoded	-.669	.103	41.992	1	<.001	.512

F Count

Logistic regression was used to analyze the relationship between Term, Department, and Race with F count. There was a statistically significant effect for all three predictor variables entered into the model as shown in Table 5.

TABLE 5
F COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
TermCoded	-.121	.029	17.303	1	<.001	.886
DepartmentCoded	-.674	.074	82.460	1	<.001	.509
Race	.147	.029	26.480	1	<.001	1.159

I Count

Logistic regression was used to analyze the relationship between Term, Department, and Race with I count. There was a statistically significant effect for DepartmentCoded and Race as shown in Table 6.

TABLE 6
I COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
DepartmentCoded	1.336	.637	4.399	1	.036	3.802
Race	.334	.129	6.716	1	.010	1.396

W Count

Logistic regression was used to analyze the relationship between Term, Department, and Race with W count. There was a statistically significant effect for DepartmentCoded as shown in Table 7.

TABLE 7
W COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
DepartmentCoded	-1.192	.126	89.341	1	<.001	.304

Pass Count

Logistic regression was used to analyze the relationship between Term, Department, and Race with P count. There was a statistically significant effect for all three predictor variables entered into the model as shown in Table 8.

TABLE 8
PASS COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
TermCoded	.076	.025	9.289	1	.002	1.079
DepartmentCoded	.830	.064	165.476	1	<.001	2.292
Race	-.137	.026	28.490	1	<.001	.872

DWFI

Logistic regression was used to analyze the relationship between Term, Department, and Race with DWFI count. There was a statistically significant effect for all three predictor variables entered into the model as shown in Table 9.

TABLE 9
DWFI COUNT: SIGNIFICANT FINDINGS ONLY

	B	S.E.	Wald	df	Sig.	Exp(B)
TermCoded	-.088	.022	15.644	1	<.001	.916
DepartmentCoded	-.857	.057	224.108	1	<.001	.424
Race	.127	.024	28.629	1	<.001	1.135

Final Grade

Ordinal regression was used to analyze the relationship between Term, Department, and Race with Final Grade Earned. There was a statistically significant effect for all three predictor variables entered into the model as shown in Table 10.

TABLE 10
FINAL GRADE EARNED: SIGNIFICANT FINDINGS ONLY

	Estimate	S.E.	Wald	df	Sig.
TermCoded 2 – During	.239	.077	9.735	1	.002
TermCoded 4 - Summer	-.207	.079	6.907	1	.009
DepartmentCoded	-.485	.039	157.207	1	<.001
Race	.090	.018	24.879	1	<.001

GPA

Ordinal regression was used to analyze the relationship between Term, Department, and Race with Final Grade Earned. There was a statistically significant effect for all three predictor variables entered into the model as shown in Table 11.

TABLE 11
GPA: SIGNIFICANT FINDINGS ONLY

	Estimate	S.E.	Wald	df	Sig.
TermCoded 2 – During	-.250	.077	10.585	1	.001
TermCoded 4 - Summer	.205	.079	6.766	1	.009
DepartmentCoded	.483	.039	155.153	1	<.001
Race	-.091	.018	26.620	1	<.001

Additional Analysis

A Kruskal-Wallis test was conducted to determine whether there is an effect of department a course was housed and GPA. The results indicate a significant difference, $\chi^2(1) = 148.575$, $p = <0.001$. This indicates a need to reject the null hypothesis that the distribution of GPA is the same across departments.

A Kruskal-Wallis test was conducted to determine whether there is an effect of race and GPA. The results indicate a significant difference, $\chi^2(6) = 223.084$, $p = <0.001$. This indicates a need to reject the null hypothesis that the distribution of GPA is the same across race.

A Kruskal-Wallis test was conducted to determine whether there is an effect of term a course was taught and GPA. The results indicate a significant difference, $\chi^2(4) = 69.118$, $p = <0.001$. This indicates a need to reject the null hypothesis that the distribution of GPA is the same across terms an online course was taught.

DISCUSSION AND CONCLUSION

The results indicate statistically significant effects across all predictor variables in each analysis area. This result encapsulates both the strengths and the weaknesses of this study. This study is intended to establish areas of statistical effective difference across student variables to form a foundation for further methodological development for teaching strategies in the post-secondary classroom and to provide a framework for future research and analysis to combat any detrimental effects for students that can be traced to divergences in the predictor variables, to minimize differential outcomes for students based on student demographical differences especially. The significant differences among all three predictor variables provides a solid foundation.

A weakness of the current research is the very nature of the work done; as this is an initial analysis of factors impacting instructional quality as it is measured based on classroom performance. The current results provide an answer to the *what* but not the *why* and therefore must be interpreted with caution.

Additionally, the current findings result from an analysis of students from the Southeast, United States. Specific caution centers around the generalizability of the findings as that was not a focus of the current work. It is possible that demographic, socio-cultural, or other factors influenced the results found. Both of these weaknesses suggest the need for additional research to assess these concerns.

Future areas of study are opened to academicians (e.g., faculty, staff, and administrators) who desire to explore potential causes of these significant areas of difference and ways to structure post-secondary teaching methodologies around these areas to modify them and further reduce potentially harmful discrepancies (e.g., racial differences). A stream of future research should focus on a continuation of analysis to see how online instructional quality changes as more instruction moves back to traditional (i.e., face-to-face) delivery, resulting in fewer faculty and students taking online instruction that are not being *forced* to do so. Additional future research should assess other instructional delivery methods and how those were impacted during a similar timeframe. Specifically, what kind of instructional quality impact occurred in traditional instruction (i.e., face-to-face) once instruction moved back to it (i.e., 2022-2023 AY). It is unclear if future research will yield broadly applicable solutions based on a wide set of demographic differences or if even more narrowly focused demographical categories (such as race only) will produce enough discrepancies to allude any “one size fits all” solutions to these educational outcome discrepancies. A foundation of analysis, nevertheless, is essential in determining future vectors of research and analysis to provide scaffolded foundations for subsequent post-secondary methodologies that attempt to reduce the gaps between (especially) underrepresented and underserved demographic groups.

REFERENCES

- Borup, J., & Evmenova, A.S. (2019). The effectiveness of professional development in overcoming obstacles to effective online instruction in a College of Education. *Online Learning*, 23(2), 1–20.
- Crawford-Ferre, H.G., & Wiest, L.R. (2012). Effective online instruction in higher education. *Quarterly Review of Distance Education*, 13(1), 11.
- Dowling, C., Godfrey, J.M., & Gyles, N. (2003). Do hybrid flexible delivery teaching methods improve accounting students’ learning outcomes? *Accounting Education*, 12(4), 373–391.
- Fish, W.W., & Gill, P.B. (2009). Perceptions of online instruction. *Online Submission*, 8(1).
- Hewson, M.G., Copeland, H.L., & Fishleder, A.J. (2001). What’s the use of faculty development? Program evaluation using retrospective self-assessments and independent performance ratings. *Teaching and Learning in Medicine*, 13(3), 153–160.
- Lang, H.G., McKee, B.G., & Conner, K. (1993). Characteristics of effective teachers: A descriptive study of the perceptions of faculty and deaf college students. *American Annals of the Deaf*, 138(3), 252–259.
- Lockman, A.S., & Schirmer, B.R. (2020). Online instruction in higher education: Promising, research-based, and evidence-based practices. *Journal of Education and e-Learning Research*, 7(2), 130–152.
- Rischin, R. (2002). Exploring learning styles: Developing a flexible teaching approach. *The American Music Teacher*, 52(2), 53–55.
- Rivera, J.C., & Rice, M.L. (2002). A comparison of student outcomes and satisfaction between traditional and web-based course offerings. *Online Journal of Distance Learning Administration*, 5(3), 151–179.
- Telford, A. (1995). Mixed-mode delivery: The best of both worlds? In D. Thomas (Ed.), *Flexible learning strategies in higher and further education* (pp. 164–175). Cassell.
- Thomas, D. (Ed.). (1995). Learning to be flexible. In D. Thomas (Ed.), *Flexible learning strategies in higher and further education* (pp. 1–11). Cassell.
- Webster, J., & Hackley, P. (1997). Teaching effectiveness in technology-mediated distance learning. *Academy of Management Journal*, 40(6), 1282–1309.