

Student Performance Comparison between Face-to-Face and Online Instructional Delivery Modalities – A Case Study Using an Introductory MIS Course

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Abstract

An analysis of 177 students at an AACSB-accredited university explores the impact of the instructional delivery mode used on students' course performance. A comparison of students' performance as measured by final course grades earned is analyzed to determine the impact (or lack of it) of face-to-face versus online instructional delivery modes, holding all other variables constant.

1. Introduction

Some universities are facing shrinking enrollment of “traditional-student” populations (full-time, residential students who prefer face-to-face instruction) for a myriad of reasons. This fact coupled with funding reductions and potential (or real) competition posed by for-profit universities, could be some of the reasons attributed to the increase in the number of online course and degree offerings occurring in higher education. Or perhaps it could be simpler than that, and it is just a reflection of the predilection of “millennials” (Internet-natives) for the virtual world in all of its manifestations. The fact is that no matter what the causes, the online mode of instructional delivery has moved beyond a stage where it can no longer be dismissed as a passing “fad” and has become part of the instructional modalities offered by institutions of higher education. This situation has prompted a division among faculty: those who praise the qualities of online instructional delivery, and those who at best do not see any benefits, or worse, vilify it.

This paper describes an attempt to reach a conclusion using a simple, yet elegant approach to this issue following Occam’s razor test. Several authors have used very contrived statistical procedures with all sorts of proxy-variables to attempt to determine satisfaction by students, attainment of learning outcomes, etc. See the reference list at the end of this paper for a sample of these studies. This case study attempts to keep all variables constant without resorting to artificial variables which raise the spectrum of lack of reliability and/or validity (both internal and external). Students achieve learning outcomes as measured by assessments given in class by instructors; these levels of achievement become translated into final grades at the end of the semester. This paper uses such measures of students’ performance – final grades to test the independence of instructional delivery modality and students’ final grade in an introductory course in MIS.

2. Background

The course analyzed for this case study is a third year, first semester, mandatory core course at a School of Business accredited by AACSB™ in a large metropolitan area. The School of Business at this unidentified state university has had the AACSB™ accreditation since the early 1990s. The analysis includes only sections of the

same course taught by the same instructor in both modalities: face-to-face and online. The instructor is certified to teach online by two external agencies (LERN™ and Quality Matters™) and one certification process internal to the university. The Learning Management System used is Blackboard™ and the instructor has access to instructional designers who hold terminal degrees in their discipline. The instructor has over thirty years of experience in higher education, and was among the early adopters of online instruction technologies since the early 1990s. The curriculum content is identical for both instructional modalities (face-to-face vs. online), the assessment system is identical for both modalities in terms of content and frequency of evaluation, the learning outcomes are identical for both modalities, and the number of contact hours (lectures as well as office hours) with students are similar.

3. Analysis

The test of independence between two variables using Chi-Square (X²) method was used. The rationale was to determine if the instructional delivery modality (face-to-face vs. online) affected the grade distribution received by students at the end of the course. The final grades of 177 students were compiled from past records for the same introductory to MIS course taught by the same instructor. Four categories of grades were created: 1) A, A- and B+; 2) B and B-; 3) C+ and C; and 4) C-, D+, D, D- and F. The fourth category lumped all the grades that resulted in a “no passing” outcome. Attention was given to make sure that the expected frequencies (F_e) were at a level of 5 or larger for reliability purposes of this statistical method. Table 1 below shows all the computations done for this analysis, the null and alternative hypotheses, the level of significance (α = 5%), the degrees of freedom, and the conclusion. Since the X² statistic was larger than the X² critical-value at α = 5% with 3 degrees of freedom, we conclude that there is no statistical basis to reject the null hypothesis. We must continue to assume independence between delivery mode and final grades.

Combined F _o	Delivery Mode		Total
	Online	F2F	
A,A-,B+	31	12	43
B,B-	29	6	35
C+,C	34	5	39
C-,D+,D,D-,F	55	5	60
	149	28	177

Combined F _e	Delivery Mode		Total
	Online	F2F	
A,A-,B+	36.198	6.802	43
B,B-	29.463	5.537	35
C+,C	32.831	6.169	39
C-,D+,D,D-,F	50.508	9.492	60
	149	28	177

Cells	F _o	F _e	F _o -F _e	(F _o -F _e) ²	(F _o -F _e) ² /F _e
(1,1)	31	36.198	-5.198	27.017	0.746
(1,2)	12	6.802	5.198	27.017	3.972
(2,1)	29	29.463	-0.463	0.215	0.007
(2,2)	6	5.537	0.463	0.215	0.039
(3,1)	34	32.831	1.169	1.368	0.042
(3,2)	5	6.169	-1.169	1.368	0.222
(4,1)	55	50.508	4.492	20.174	0.399
(4,2)	5	9.492	-4.492	20.174	2.125
Sum	177	177.000			7.552 = χ ² statistic

H₀: Independence between Delivery Mode and Grades
 H₁: Dependence between Delivery Mode and Grades
 α = 5%
 D. of Freedom = 3
 χ² critical value = 7.815

Conclusion: Since χ² statistic is less than χ² critical value, do NOT reject H₀

Table 1. X^2 Test of independence between two variables.

4. Results

These findings should be interpreted with the following caveats: the instructor has many years of teaching experience using both modalities successfully; the instructor holds three certifications as an online instructor; and the instructor has had the assistance of qualified instructional designers in adapting this course to the online environment.

5. References

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