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Impact of Entrepreneurship Infusion on Student Performance in an Introduction to Business Course

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ABSTRACT: *Introduction to Business, BADM 101, is an undergraduateintroductory business course offered primarilyto freshman students at a public university in Houston, Texas. During a recent semester, two sections of the BADM 101 course were offered: one section was conducted in a traditional face-to-face format with an emphasis on entrepreneurship, while the other section was offered online without an entrepreneurial focus.This article explores the impact of an infusion of entrepreneurshipon student performance in the introduction to business course.*

KEYWORDS: *entrepreneurship infusion,delivery modalities, face-to-face, synchronous, online instruction*

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I. INTRODUCTION

The infusion of entrepreneurship into a country's business activities has long been recognized as a catalyst for economic development, economic growth, and employment creation (Padmaja and Madhohaa, 2023). Today, the integration of entrepreneurial education into business curricula is commonplace at many universities. Kauppila, Kivelä, and Tornikoski (2019) conducted a systematic review of literature, and their findings highlight the importance of promoting entrepreneurship in higher education.Cope and Kempster (2019) provided theoretical perspectives and future directions for entrepreneurial learning in higher education, emphasizing the importance of creating an environment that fosters innovation and entrepreneurship.

The benefits and limitations of online instruction, when compared to classroom-based face-to-face (F2F) instruction, have been researched and debated for several years. There appears to be a blurred dichotomy between the two schools of thought. There are educators whoposit that the personal touch of a live instructor and F2F classroom interactions among students is essential to the college learning experience, particularly for students whose secondary education learning experiences have not fully prepared them for college (Ramsden and Entwistle, 1981). Brown (1996) and Hara and Kling (2000) suggest that students in the online environment may experience isolation, confusion and frustration that adversely affect the efficacy of their learning.

Another school of thought advocates for online instruction suggesting that online participation may be less intimidating to students who tend to be more reserved in a classroom.Student learning is enhanced by the quality and quantity of interactions, both student to student and student to instructor interactions, which exist in the online environment.

Differences in student performance, in the F2F, hybrid and online environments, have also been professionally researched without a clear conclusion of which modality is best suited for student learning. Carmel and Gold (2007) advise that there is not a statistically significant difference in student performance between F2F and hybrid modes of instruction. Helms (2014) suggests that online students have significantly lower grade point averages (GPAs)than F2F students. Other authors advise that statistically significant differences existed in student performance between online and traditional courses (Atchley, Wingenbach, and Akers, 2010; Faux and Black-Hughes, 2000; Paden, 2006; Shoenfeld-Tacher, McConnel, and Graham, 2001).

In this study, a section of the course taught face-to-face, focused primarily on fostering entrepreneurial thinking and innovation. It required students to actively engage in the process of creating and developing a business idea from the ground up and presenting it to their classmates. The centerpiece of this section was the business plan assignment, where students were required to develop a comprehensive document outlining their business concept, strategy, and execution plan. This assignment included market analysis, financial projections, marketing strategies, and operational plans.

The second section, delivered online, was conducted traditionally, lacking an entrepreneurial focus. This course focused on the foundational theories, principles, and practices of business, without the entrepreneurial lens. The curriculum aimed to educate students about established business operations and

management techniques. Topics covered included business law, organizational behavior, and strategic management; however, students were not required to create a business plan or develop new business ideas.

This paper explores the existence of a difference in student performance in a section of the Introduction to Business course offered F2F where Entrepreneurship is infused into the curricula and a section taught online where Entrepreneurship is not introduced into the curricula. This study does not isolate the effect of delivery modality differences (F2F and online) from the entrepreneurial infusion effect in student performance.Results of this case study may not be extendable to other larger entrepreneurial infusion or delivery modality studies since the student performance observationsin each of the two groups of data are nonrandom.

Entrepreneurship Infused Online	Entrepreneurship Excluded Face-to-Face
71	93
95	85
93	94
86	95
97	93
96	0
86	5
89	72
90	23
93	81
98	81
93	99
87	72
84	88
69	90
98	95
65	74
100	0.4
97	85
83	98
94	98
98	32
62	30
85	
94	
93	
96	
71	
43	
25	
95	
95	
96	
92	
95	
83	

Table 1: *Data Sets*

W/BP		*W/O BP*	
Mean	85.75	Mean	68.84348
Standard E	2.70607	Standard E	7.157792
Median	93	Median	85
Mode	95	Mode	93
Standard I	16.23642	Standard I	34.32756
Sample Va	263.6214	Sample Va	1178.382
Kurtosis	5.442892	Kurtosis	-0.25789
Skewness	-2.22755	Skewness	-1.14021
Range	75	Range	99
Minimum	25	Minimum	0
Maximum	100	Maximum	99
Sum	3087	Sum	1583.4
Count	36	Count	23

Table 2: *Descriptive Statistics*

Table 1 displays student performance scores for sections of the course with entrepreneurship infused (with a business plan) (EI)and where entrepreneurship was excluded (without a business plan) (EN). Table 2 shows descriptive statistics for the two groups of student performance scores. Note that the mean and median performance scores for the EI group are substantially higher than those for theENgroup while the variation is significantly larger for the EN group.

Figure 1 displays a scatterplot of the student performance data. There appears to be a substantially smaller variation in the EI group when compared to EN group. This is also supported by boxplots on both groups in Figure 2. Figure 2 displays a box and whispers plot on the data. Note that the interquartile range (IQR) is substantiallylarger for the EN group, indicating a possibility of non-homogeneity of the variation among the groups. The initial question to be explored is whether that difference in variation among the groups is statistically significant.

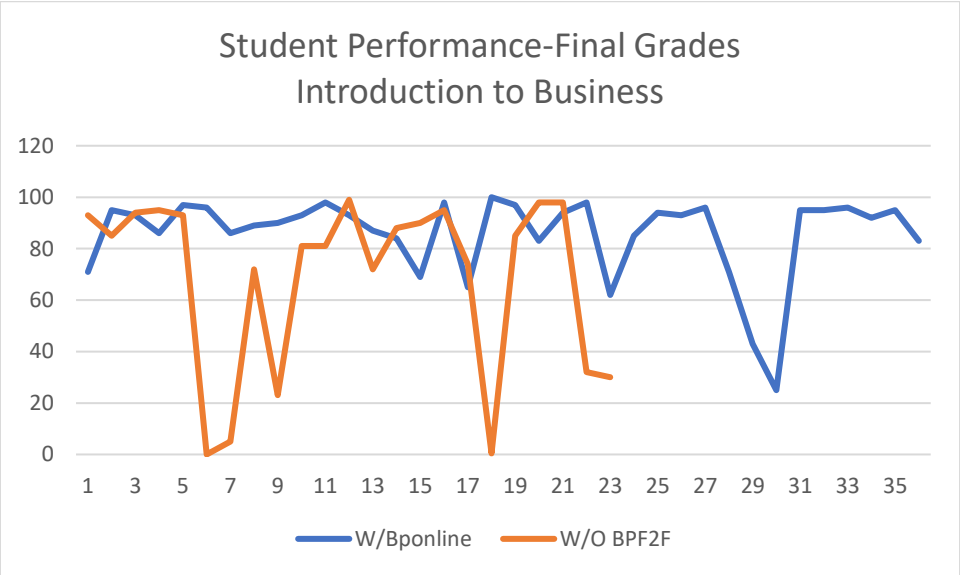

Figure 1: Scatterplot of Student Performance Scores

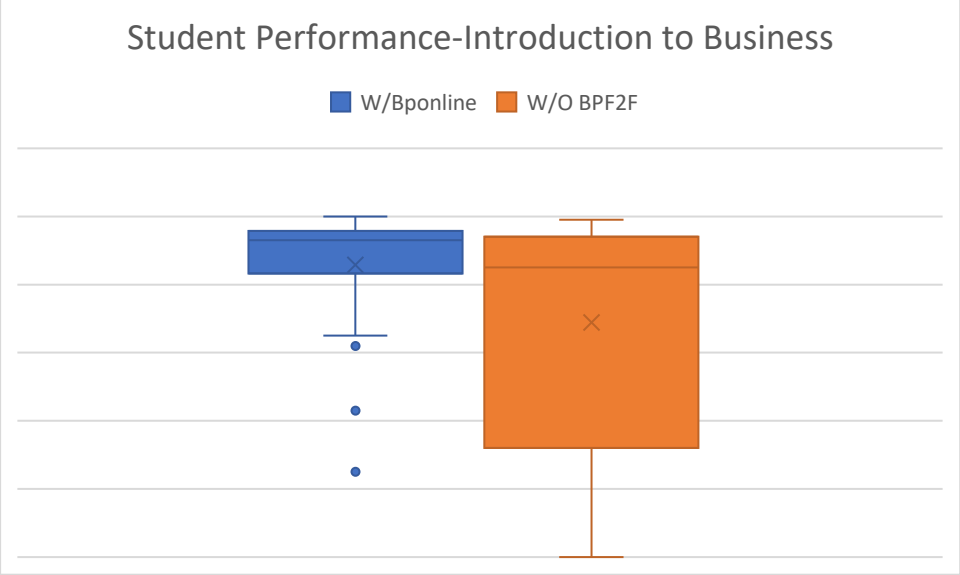

Figure 2: Box and Whiskers Plot of Student Performance Scores

II. DATA ANALYTICS

A difference in variation between groups may beverified by an F Test, shown in Table 3. At a 5% significance level with F=0.224 and a p= 0.0000422, the variation among the student performance data groups is significantly different.Therefore, an independent samples t test would be appropriate for testing for a difference in the mean performance scores between the groups.

The key research question of this study is:
Is there a difference in student performance scores of students in the entrepreneurship-infusedand the entrepreneurship-excluded groups?
Expressed statistically:
H_O: $\mu_{EI} = \mu_{EN}$(student performance scores are the same for the entrepreneurship-infused and the entrepreneurship-excluded groups)
H_A: $\mu_{EI} \neq \mu_{EN}$

F-Test Two-Sample for Variances		
	W/Bponlin	*N/O BPF2F*
Mean	85.75	68.84348
Variance	263.6214	1178.382
Observati	36	23
df	35	22
F	0.223715	
P(F<=f) or	4.22E-05	
F Critical c	0.539374	

Table 3: F Test on Equality of Variances

t-Test: Two-Sample Assuming Unequal Variances		
	W/Bponlin	*N/O BPF2F*
Mean	85.75	68.84348
Variance	263.6214	1178.382
Observati	36	23
Hypothesi	0	
df	28	
t Stat	2.209355	
P(T<=t) or	0.01775	
t Critical o	1.701131	
P(T<=t) tw	0.035499	
t Critical t	2.048407	

Table 4: Independent Samples T Test

The independent-samples t test of Table 4 shows t=2.209, df= 28 with a p= 0.018. At a 5% significance level, there is a statistically significant in the performance of students in the entrepreneurship-infused and entrepreneurship-excluded groups.

III. CONCLUSION

This article has explored the existence of a difference in student performance in a section of the Introduction to Business course offered F2F where Entrepreneurship is infused into the curricula and a section taught online where Entrepreneurship is not introduced into the curricula. This study does not isolate the effect of delivery modality differences (F2F and online) from the entrepreneurial infusion effect in student performance.There was not a significantperformance differencein students receiving an infusion of entrepreneurship into the Introduction to Business courses.Students who experiencedthe entrepreneurship infused course performed at a substantially higher level than students who did not receive the infusion of entrepreneurship into their course.

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