

Reduced contact hour accelerated courses and student learning

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ABSTRACT

Undergraduate instruction in the Davis College of Business at Jacksonville University utilizes two course delivery methods. Traditional daytime classes are 15 weeks long and have approximately 40 contact hours, while evening courses are offered in the Accelerated Degree program in a compressed 8-week format with 24 contact hours. The curriculum is the same for both delivery methods. In the capstone management course taken by all undergraduate business majors, the Educational Testing Service Major Field Test for the Bachelor's Degree in Business (MFTB) is administered for assessment purposes. Since this test is given to both traditional undergraduates and students enrolled in the Accelerated Degree Program, it provides a useful way to see if the method utilized to deliver the course makes a difference in student learning, as measured by the scores on this test. Of course, there are other factors that could affect the scores on this exam, including cumulative GPA and a variety of other educational and demographic attributes of the students enrolled in these programs. After taking all relevant factors into account, the analysis performed in this study shows that the average score on the MFTB is significantly higher for the students enrolled in the accelerated capstone class.

Keywords assessment, method of course delivery, accelerated learning, Major Field Test for Business, accelerated instruction

INTRODUCTION

In addition to a traditional 15-week instruction period, many schools, including Jacksonville University (JU), offer accelerated learning opportunities. At JU, a student can earn a Bachelor's Degree in Business Administration with the traditional delivery method, or by taking classes lasting 8 weeks that are offered through the Accelerated Degree Program (ADP). The content of the course offerings in both programs is the same, with the students enrolled in the ADP expected to do more work outside the classroom. The primary difference in the two delivery methods is the amount of face-to-face contact time that students have with the instructor of the course. In the traditional 15 week courses, student have approximately 40 hours of face-to-face contact time with their instructor. In the 8 week accelerated courses, that face-to-face contact time is reduced to 24 hours.

An important question to investigate is if there is a difference in student learning by delivery method. It is possible to examine this issue by looking at the results on the Educational Testing Service Major Field Test for the Bachelor's Degree in Business (MFTB). Since JU's Davis College of Business is accredited by the Association for the Advancement of Colleges and Schools of Business, every year this test is administered to a sample of JU business majors enrolled in the capstone management course for assessment purposes. Thus, this test provides a useful tool for exploring the question of interest.

LITERATURE REVIEW

There is no shortage of research that examines the relationship between student learning and the method used to deliver instruction. For example, much research is devoted to comparing outcomes between online and traditional, face-to-face delivery methods. However, these studies may not be relevant for addressing the topic of interest in this research. The two important characteristics in the alternative delivery system under investigation in this paper are a shorter course length (8 weeks versus 15 weeks) coupled with reduced face-to-face contact hours with the professor teaching the class (24 hours versus approximately 40 hours).

In previous research involving delivery methods with at least one of the attributes mentioned above, there is substantial agreement that there is either no significant difference in student learning by delivery method, or a small positive increase in learning associated with accelerated classes (Banks & Faul, 2007; Austin and Gustafson, 2006; Wlodkowski and Westover, 1999). Some research has indicated that if a positive impact in learning is associated with accelerated instruction, it is short-lived and over time there is no significant difference in learning between accelerated and traditional methods of instruction (Seamon, 2004).

NULL AND ALTERNATIVE HYPOTHESES

Null Hypothesis: After controlling for the impact of other relevant variables, there is no difference in MFTB scores based on the method of delivery (traditional vs. accelerated).

Alternative Hypothesis: After controlling for the impact of other relevant variables, there is a difference in MFTB scores based on the method of delivery (traditional vs. accelerated).

DATA

After obtaining permission from the JU Institutional Review Board, MFTB scores were obtained for students enrolled in the capstone management class in both the ADP and traditional fall 2014 and spring 2015 semesters. This resulted in a sample consisting of 77 observations, with 59 students who took the capstone class during the traditional semester and 18 students who took it during the shorter ADP semester. The MFTB consists of 120 multiple choice questions in the areas of accounting, economics, management, quantitative business analysis, information systems, finance, marketing, legal and social environment, and international issues (Educational Testing Service Major Field Tests, 2016).

The Institutional Review Board also approved the collection of other information about the students in the sample. This other information includes cumulative GPA, major, minor, whether the student has more than one major, whether the student is a transfer, age, gender, and the delivery method of the capstone class (traditional or ADP). It is hypothesized that these variables are important factors in the determination of MFTB scores.

Previous research has shown cumulative GPA to be an important variable in explaining the variation in MFTB scores (Arbogast and Thornton, 2012). Likewise, the other variables in the analysis have been used in previous studies concerned with determining the variables that affect performance on the MFTB (Bycio and Allen, 2007).

It should be noted that a variable that measures the student's age is included in the analysis because of the initial purpose of the ADP. When evening courses were introduced at JU, the purpose of the program was to make it possible for older students with previous college experience to complete their degrees by taking classes at night, presumably because they had jobs that occupied their daytime hours. In fact, the mean age of the sample of students in the traditional capstone class is 23.6 years, while the mean age of the sample of students in the evening class is 37.6 years. So, if this variable was not explicitly included in the analysis, it would be impossible to distinguish between the impact of age and method of delivery on MFTB scores.

METHODOLOGY

The data was analyzed using both a two-sample t-test and multiple regression. The t-test allows for a comparison of scores between the two delivery methods that is very straightforward. Unfortunately, it has the weakness of ignoring the impact of other variables that could be important in determining these scores. In a multiple regression with MFTB score as the dependent variable, other factors theorized to affect this variable can be incorporated into the analysis. The impact of the method of delivery on MFTB scores can then be investigated by including it as a binary variable on the right-hand side of the regression equation.

RESULTS

Table 1 (located in Appendix) shows the important descriptive statistics for the MFTB results for the entire sample, the traditional delivery method, and the ADP delivery method. Without taking other factors into consideration, the average MFTB score of ADP students is 9.6 points higher than the score of traditional students. If a student enrolled in the traditional semester capstone class scored the mean for his or her group (148.3), the score would be in the

38th percentile. For a student enrolled in the accelerated capstone class scoring at the mean for that group (157.9), he or she would be in the 66th percentile. This is a difference of some consequence (Educational Test Service Major Field Tests, 2015).

The result of the two-sample t-test provides substantial evidence that there is a difference in the mean MFTB score between traditional and ADP students ($t = 2.54$, $p\text{-value} = 0.013$). Without considering the impact of other variables that could potentially affect MFTB scores, it appears that the shorter delivery method yields better results on this test. Potential reasons for this difference are considered in the conclusions section of this paper.

For the results of a two-sample t-test to be valid, it is assumed that the samples were drawn from normally distributed populations with equal variances. The assumption that the 2 samples come from populations with the same variance was tested with the appropriate F-test. The result of this test supports this assumption ($F = 1.61$, $p\text{-value} = 0.277$). The assumption that the samples were drawn from normally distributed populations was tested using the Anderson-Darling test. The sample evidence indicates that this assumption is satisfied (for traditional: $AD = 0.492$, $p\text{-value} = 0.211$; for ADP: $AD = 0.303$, $p\text{-value} = 0.537$).

A deficiency of the two-sample t-test is that it doesn't take into consideration the influence of other variables that may play a role in determining student performance on the MFTB. Multiple regression provides a way to examine the influence of the method of course delivery on MFTB scores while considering the impact of other variables that are also thought to be important determinants of performance on the MFTB. A list of the other variables presumed to influence MFTB scores can be found in table 2 (located in Appendix).

The results of the initial regression analysis are found in table 3 (located in Appendix). This model has good explanatory power ($F = 6.74$, $p\text{-value} = 0.0000$, adjusted $r^2 = 37.68\%$). Table 3 lists estimated coefficients, t-ratios, and the corresponding p-values for the independent variables in the initial model.

The result of performing regression on the initial model shows that many of the independent variables are not significantly related to the dependent variable, MFTB score. The regression procedure was repeatedly performed while dropping one independent variable at a time. The independent variable removed from the model on each step was the one with the largest p-value, or the smallest t-ratio (in absolute value). This procedure was repeated until a final model was determined. The final model only includes independent variables that have estimated regression coefficients with p-values less than ten percent. Table 4 (located in Appendix) shows which independent variable was dropped on each step, along with the p-value associated with its estimated coefficient.

The ultimate model contains only those variables that are significantly related to the dependent variable, cumulative GPA and ADP (delivery method). These p-values corresponding to the estimated coefficients on the remaining variables are all less than 10 percent. This final model has significant explanatory power ($F = 21.28$, $p\text{-value} = 0.0000$, adjusted $r^2 = 34.8\%$). The results of this model are summarized in Table 5 (located in Appendix).

DISCUSSION

The results obtained are consistent with previous research showing either no significant difference between the two delivery methods, or a significantly higher score for accelerated instruction. The p-value of 0.07 for the estimated coefficient on ADP straddles the line between significant and not significant. At the more stringent 5 percent level of significance, the ADP

variable would not be included in the final model. However, the p-value of 0.07 is very close to the 5 percent cut point, and the result is significant at the more relaxed 10 percent standard.

In other words, at the 5 percent level of significance, the appropriate decision would be “Do not reject the null hypothesis,” and the conclusion would be that there is no difference in student learning, as measured by the score on the MFTB, between the two delivery methods. However, at the ten percent level of significance, the appropriate decision would be “Reject the null hypothesis,” and the conclusion would be that there is a difference in student learning, as measured by score on the MFTB, between the two delivery methods. Furthermore, the evidence suggests that the accelerated learning format is superior to the traditional method of delivery, at least in the case of scores on the MFTB.

After adjusting for the impact of cumulative GPA, the difference between the ADP and traditional scores is reduced from the unadjusted 9.6 points to 6 points, as can be seen in the final regression equation $\hat{Y} = 97 + 16.7 \cdot \text{CGPA} + 6 \cdot \text{ADP}$, where Y is used for MTBF. To put this in perspective, consider a student with a cumulative GPA of 3.0. If this student took the capstone class in the traditional format, the value of ADP would be zero and the estimated value of MTBF would be 147. In 2015, a MTBF score of 147 would be in the 35th percentile. On the other hand, if this student took the capstone class in the ADP format, the value of ADP would be one and the estimated value of MTBF would be 153, which is in the 52nd percentile. While this difference is not as profound as the unadjusted difference of 9.6 that is discussed above, it is still remarkable (Educational Testing Service Major Field Tests, 2015).

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Professors who lament the move away from the traditional education model (15 or 16 week semesters, face-to-face instruction) do so because of the perceived negative impact of online or accelerated classes on learning. While the effectiveness of online classes isn't part of this research, the impact of accelerated classes on learning doesn't appear to be a cause for concern, and may in fact cause educators to consider the accelerated delivery method to be superior to the traditional.

Trying to find reasons why the accelerated delivery method may be superior to the traditional approach is an exercise in speculation. However, it is possible that providing students with more time out of the classroom translates to more study time, or that forcing professors to limit their face-to-face time with students causes them to focus on the most important and essential elements of the subject matter. It has also been theorized that students inclined to enroll in the accelerated classes could be more motivated than students who prefer traditional courses. Finally, it is also conceivable that having a shorter amount of time for a class (8 weeks vs. 15 weeks) creates a sense of urgency for students, and consequently they may increase their efforts to learn the material. However, this is just conjecture.

Regarding future research, repeating the analysis with a new sample could be helpful in determining if the method of delivery affects learning. Likewise, modifying the model by introducing new variables into the analysis may achieve the same result. Unfortunately, in research of the type that has been conducted for this paper, there is a limit to the information available on the academic, educational, and demographic attributes of students that is available from the Registrar's office or the Office of Institutional Research.

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APPENDIX

Table 1: Descriptive Statistics for MFTB Scores (Combined, Traditional Only, ADP Only)

Statistic	Combined (n = 77)	Traditional (n = 59)	ADP (n = 18)
Mean	150.5	148.3	157.9
Standard Deviation	14.7	14.8	11.7
Minimum	121	121	135
Median	149.0	146.0	160.5
Maximum	192	192	175

Table 2: Independent Variables in the Multiple Regression Analysis

Variable	Description
CGPA	cumulative GPA
MAJOR	marketing, management, international business, business administration = 0, accounting, economics, finance = 1
DOUBLE	one major = 0, more than one major = 1
MINOR	no minor = 0, minor(s) = 1
TRANSFER	not a transfer = 0, transfer = 1
AGE	age in years
GENDER	male = 0, female = 1
ADP	traditional = 0, ADP = 1

Table 3: Multiple Regression Results for the Initial Model

Variable	Estimated Coefficient	T-Value	P-Value
Constant	89.11	7.91	0.0000
CGPA	18.046	5.66	0.0000
MAJOR	2.529	0.83	0.4104
DOUBLE	4.676	1.32	0.1928
MINOR	-4.456	-1.26	0.2134
TRANSFER	-6.873	-1.68	0.0977
AGE	0.2434	0.89	0.3740
GENDER	-3.841	-1.36	0.1777
ADP	7.099	1.38	0.1713

Table 4: Variables Removed from Model

Step	Variable Removed	P-Value
1	MAJOR	0.4104
2	AGE	0.4180
3	MINOR	0.2096
4	TRANSFER	0.1787
5	GENDER	0.1317
6	DOUBLE	0.1400

Table 5: Multiple Regression Results for the Final Model

Variable	Estimated Coefficient	T-Value	P-Value
Constant	96.967	10.75	0.0000
CGPA	16.663	5.77	0.0000
ADP	5.979	1.84	0.0699

