

## Comparing outcomes between a traditional F2F course and a blended ITV course

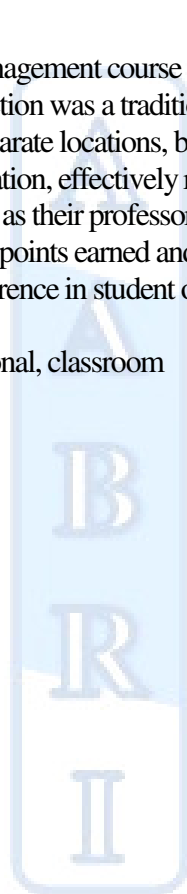
R. Nicholas Gerlich  
West Texas A&M University

Marc Sollosy  
West Texas A&M University

### Abstract

Two sections of the Principles of Management course were examined to compare student outcomes based on course delivery method. The first section was a traditional F2F class, while the second section was parallel cohorts of students meeting in two separate locations, but linked by ITV (Interactive Television). The professor appeared once per week in each location, effectively resulting in a hybrid synchronous ITV delivery in which students were only in the same room as their professor 50% of the time. Regression analysis, t-tests and correlations were performed on both total points earned and student scores on an assessment exam. Results showed there to be no significant difference in student outcomes between the two delivery methods.

Keywords: hybrid, blended, ITV, F2F, traditional, classroom



## Introduction

The purpose of this study was to examine the differences, if any, in student outcomes performance between the more traditional in class face-to-face (F2F) delivery and a hybrid synchronous mode utilizing Interact Television (ITV). Advances in both network and communications technology has influenced the means by which course material can, and is being delivered. As newer delivery modes enter the mix, the basic question that needs to be asked is...does the delivery mode have any impact upon the student's overall performance in the course?

There is a significant shift from providing exclusively traditional (F2F) classroom instruction to providing various means for reaching out to students by delivering courses at a distance using technology. Distance education is already a significant element in higher education and it continues to expand at an increasingly rapid rate. (Rovai, 2004 5(2)). Blended course learning is a hybrid of traditional (F2F) and online learning such that instruction occurs both in the classroom and via technology means. The technological component is a natural extension of the traditional (F2F) classroom experience, and allows for colleges and universities to effectively be in multiple places at the same time via ITV. Blended instruction provides a flexible approach in course design supporting the blending of different times and places for learning. This provides the convenience of multiple delivery modes without the complete loss of face-to-face contact. The result is a potentially more robust experience than a singular delivery method may provide (Rovai, 2004 5(2)).

Research continues to examine, and thus debate, whether learning through a distance or blended delivery mode is comparable to traditional (F2F) on campus learning. Numerous articles report no significant difference between the learning outcomes of students in non-traditional courses compared to those students on comparable traditional courses. Other articles, though significantly fewer in number, have reported significant differences do exist (Parkinson, Jul-Aug 2003 47(4)).

A review of the literature yields mixed results regarding the impact of the delivery mode upon actual student performance outcomes. There is a fairly large body of work that examines aspects of learners' learning and satisfaction. Work by Lim, Morris and Kupritz (Lim 2007, 11 (2)) looks at varying delivery formats as they relate to their effectiveness for learners' learning and satisfaction. (Nielsen 2008) Nielsen concluded that in regards to retention and achievement, blended learning is similar, and maybe even slightly better, concerning interaction and satisfaction. Studies by Lim, et al, indicate that learners in a blended mode believed that they actually experienced a significant increase in both perceived and actual learning. The actual results indicated that delivery format did not reveal any significant differences in course outcomes (Lim, 2007, 11 (2)).

Drennan, Kennedy and Pisarski (2005) (Drennan 98(6)) noted that a number of universities are combining interactive technology and more active modes of learning. Interactivity as applied in this environment may look at outcomes between students and the technology. The learner of today experiences with technology mirrors their non-classroom experiences with internet access, video games, cell phones, instant messaging, and email (Rodgers 2008).

## Literature Review

The literature regarding student performance and outcomes across various delivery modes presents a variety of work examining the variables of interaction and satisfaction. The National Education Association's 2000 survey (Association 2000) of faculty found that most perceived that online teaching was less effective in developing the critical skills of problem-solving, student interactivity, oral presentations, and verbal skill than the onsite (F2F) alternative (S. M. Nielsen 2008). The concept of a new delivery method that straddles the chasm between the traditional onsite (F2F) and the online learning is hybrid or blended learning. Blended

learning encompasses a combination of face-to-face instruction with computer, or other – mediated instruction (Graham, 2006). In any learning situation there is the increasing need to ascertain that the intended learning outcomes are actually being achieved. Is the student achieving the desired performance standards for the course?

There is also an increasing body of literature examining the determinants of student performance in courses. One of the most useful means has been the application of Assessment. Assessment is a “systematic collection, review, and use of information about educational programs undertaken for the purpose of improving student learning and development” (Palomba, 1999). University business programs are increasingly feeling the need to assess the performance of students in their programs (Adams, 2000) (Terry, 2008, 19(1)) (Gerlich, 2009, 13(1)). Since the mid-1980s there has been a strong movement towards student centric and learning-oriented assessments and accreditation (Lubinescu, 2001, 113). The AACSB imposes standards for program learning goals for those institutions desiring to attain or maintain AACSB accreditation. These programs typically utilize some form of direct measure to demonstrate student achievement of the course and program stipulated goals (Martell, 2007 82(4)).

Assessment data serves two constituents. The internal audience ( faculty, students, assessment committees, administrators, and alumni) benefit by aiding to define successful programs, implementing similar programs, and for improving less successful programs. The assessment data can be used externally to demonstrate the institution’s effectiveness and accountability to such organizations as; accreditation organizations, government officials, government boards, and the like (Aloi, 2003 52(4)) (Gerlich, 2009, 13(1)).

Assessment instruments must demonstrate validity. Validity occurs when the scores on the instrument accurately reflect achievement along the dimensions being evaluated. Validity has several dimensions, principle among them is content and context. Content validity exists when the instrument covers and measures specific course or program curriculum. Context validity examines to what extent the outcomes logically correlate with other, external, variables associated with the subjects’ achievement. In addition, one needs to consider criterion validity, or the extent to which test scores correlate with other variables one would expect to be associated with test performance (Black, 2003 79) (Gerlich, 2009, 13(1)).

The educational Testing Service’s (ETS) exam in business is viewed as one of the preeminent standards for standardized assessment instruments in collegiate business programs. Reviewing the literature highlights almost universal agreement regarding the primary variables that should be used as predictors of student performance on the ETS exam. These variables include: grade point average (GPA), standardized test scores (ACT/SAT) and gender. Mirchandani, et al, (2001) also include transfer GPA and student grades in quantitative courses (Mirchandani, 2001 (77)).

These variables have been successfully extrapolated and used in examining the results of local instruments (Terry, 2008, 19(1)) (Gerlich, 2009, 13(1)). Terry, et al, (2008) developed a model that utilized a production view of student learning as a determinant of performance on the business major field achievement ETS exam. That model controlled grade point average (GPA), standardized test scores (ACT/SAT), junior college transfer students, and gender. The findings from that study were consistent with much of the previous research done in the area, that academic ability as measured by grade point average (GPA) and scores on standardized tests (ACT/SAT) are the primary determinants of student performance (Gerlich, 2009, 13(1)).

## **Methodology and Hypotheses**

Data were collected among students in two sections of a Principles of Management course at a regional Division II state university during a 15-week semester. The first section of the class met as a traditional F2F course, with their professor present 100% of the time. The other section was two separate

smaller cohorts taking the class via synchronous ITV (Interactive Television). The professor alternated locations each session, effectively yielding a course section in which all students had only 50% of their class time in the same physical location as the instructor. There were 43 students in the first section, and 40 students in the second.

Two specific measures in both classes (Total Points Earned, or TPE, and score on an embedded Assessment Exam, or AE) were utilized for comparative analysis. Based on the prior research cited above, we expected there to be no difference in outcomes between the two course sections. The first step was to calculate t-tests for independent means for both groups, examining both TPE and AE. A multitude of earlier studies all point to there being no difference in student outcomes regardless of delivery method. Thus, we hypothesize the following:

H1: There will be no significant difference in TPE between the F2F and ITV courses.

H2: There will be no significant difference in AE between the F2F and ITV courses.

The second step was to perform a regression analysis of the full data set using both TPE and AE as dependent variables. Independent Variables and Hypotheses included in the equations included:

(a) Section (1=F2F; 2=ITV)

(b) GPA (0.00 – 4.00)

(c) Gender (0=Male; 1=Female)

(d) Age (measured in years)

Model 1:  $TPE = a + B1(\text{Section}) + B2(\text{GPA}) + B3(\text{Gender}) + B4(\text{Age}) + e$

Model 2:  $AE = a + B1(\text{Section}) + B2(\text{GPA}) + B3(\text{Gender}) + B4(\text{Age}) + e$

Prior research, as noted above, indicates that delivery mode poses no difference in student outcomes. Thus, we hypothesize:

H3a: Section will not be a significant predictor of TPE

H3b: Section will not be a significant predictor of AE

H4a: GPA will be a significant predictor of TPE

H4b: GPA will be a significant predictor of AE

H5a: Gender will not be a significant predictor of TPE

H5b: Gender will not be a significant predictor of AE

H6a: Age will not be a significant predictor of TPE

H6b: Age will not be a significant predictor of AE

## Results

T-tests were calculated to compare mean scores on TPE and AE for both groups (see Table 1). For TPE, Section 1 (the F2F class) had a mean score of 772.57 (out of 1000), while Section 2 had a mean score of 797.78. The two sections were fairly equal in size ( $n = 43$  for Section 1, and  $n = 41$  for Section 2). There was

no significant difference between the mean scores for the two groups ( $t = -1.012$ ;  $p = 0.315$ ). For AE, Section 1 had a mean score of 36.65 (out of 50), while Section had a mean score of 37.44. Once again, there was no significant difference in their mean scores ( $t = -0.351$ ;  $p = 0.726$ ). We thus retain H1 and H2. If anything, it should be noted that the ITV class section had marginally higher scores on both the TPE and AE components.

A regression model was then fitted using TPE as the dependent variable, and Section, GPA, Gender and Age as independent variables (see Tables 2a and 2b). The only significant predictor is GPA ( $t = 04.689$ ;  $p = 0.000$ ), which is consistent with numerous prior studies in the literature. The model does a fairly good job of fitting the data, with R-square = 0.261. Section, Gender and Age were not significant predictors. We thus retain H3a, H4a, H5a and H6a.

A second regression model was then calculated using AE as the dependent variable, and with the same set of independent variables (see Tables 3a and 3b). In this model, GPA was once again the only significant predictor ( $t = 5.718$ ;  $p = 0.000$ ). There was a slightly better fit of the model (R-square = 0.334). Section, Gender and Age were once again not significant predictors. We thus retain H3b, H4b, H5b and H6b.

Finally, correlations were calculated for all of the variables included in this analysis (see Table 4). As would be expected, AE and TPE are highly correlated, but this is because AE is a subset of TPE; furthermore, since both are dependent variables, their correlation is not of statistical concern. GPA is also highly correlated with both AE and TPE, consistent with the model results above. Finally, Age is significantly correlated with TPE, yet failed to be a significant predictor in either model. While older students may have produced higher TPE numbers than did younger students, this difference was not enough for Age to be a strong predictor. Finally, the lack of inter-item correlations among the independent variables demonstrates that there is low risk of multicollinearity in either model.

## Discussion

As in the case of comparing outcomes in online vs. campus courses, there is no significant difference in the outcomes between students in a traditional class and those in a hybrid ITV course. The reduced number of class sessions in which the professor appeared “live” vs. via ITV had no effect on performance measures. Furthermore, students in the ITV hybrid had slightly higher outcomes than those in the traditional course.

GPA was proven once again to be the most important predictor of student outcomes, regardless of class section enrollment. This serves to confirm earlier research, with the distinction being the application to a different course delivery modality. In the case of this research, we conclude that the hybrid ITV course was no different from its traditional counterpart in terms of outcomes, confirming the findings of Lim (2007).

This study is limited in that it examines only one pair of courses in one discipline taught by one instructor. That said, comparisons of this type necessarily must be of courses simultaneous in delivery in order to control for external sources of variation, such as semester, year, instructor, etc.

Further research must be completed comparing hybrid ITV courses across other disciplines as well as instructors. In addition, it would be fruitful to compare outcomes in online, on-campus and hybrid ITV courses together. This would require a high degree of control over teaching methods, texts, materials, etc., in order to try to isolate any possible outcome differences between these student groups.

## References

- Adams, C. T. (2000). Business Student's Ranking of Reasons for Assessment: Gender Differences. *Innovation in Education and Training International* .
- Aloi, S. L. (2003 52(4)). A framework for assess general education outcomes within majors. *JGE: The Journal of General Education* , 237-252.
- Association, N. E. (2000). *A Survey of traditional and distance learning*. Washington, DC: NEA.
- Black, H. &. (2003 79). Evaluating and Improving Student Achievement in Business Programs: The Effective use of Standardized Assessment Tests. *Journal of Education for Business* , 157-162.
- Drennan, J. K. (98(6)). Factors affecting student attitudes toward flexible online learning in management education. *The Journal of Educational Research* , 331 - 338.
- Gerlich, R. N. (2009, 13(1)). Evaluating the Assessment Outcomes in the Principles of Marketing Course. *Academy of Educational Leadership Journal* , 127-135.
- Graham, C. (2006). Blended Learning. In I. C. (Eds.), *The Handbook of blending learning* (pp. 3-21). Sanfrancisco: Wiley.
- Lim, D. M. (2007, 11 (2)). Online vs. blended learning: Differences in instructional outcomes and learner satisfaction. *Journal of Asynchronous Learning Network* , 27-42.
- Lubinescu, E. R. (2001, 113). Two continuums collide: Accreditation and Assessment. *New Directions for Higher Education* , 5-21.
- Martell, K. (2007 82(4)). Assessing student learning: Are business schools making the grade? *The Journal of Education for Business* , 189-195.
- Mirchandani, D. L. (2001 (77)). Assessing Student Learning Outcomes: A Comparative Study of Techniques Used in Business School Disciplines. *Journal of Education for Business* , 51-56.
- Nielsen, S. M. (2008). "Half Bricks and Half Clicks": Is Blended Onsite and Online Teaching and Learning the Best of Both Worlds. *COERC 2008 - Proceedings of The Seventh Annual College of Education Research Confernece* (pp. 105 - 110). Miami, FL: Florida International University.
- Nielsen, S. M. (2008). "Half Bricks and Half Clicks": Is Blended Onsite and Online Teaching and Learning the Best of Both Worlds? *COERC 2008 - Proceedings of The Seventh Annual College of Education Research Conference* (pp. 105 - 110). Miami, Florida: Florida International University.
- Palomba, C. &. (1999). *Assessment essentials: Planning, implementing, and improving assessment in higher education*. San Francisco: Jossey-Bass.
- Parkinson, D. G. ( Jul-Aug 2003 47(4)). Emerging Themes of Student Satisfaction in Traditional Course and a Blended Distance Course. *TechTrends* , 22-28.
- Rodgers, M. R. (2008). The 21st Century Learner. *22nd Annual Conference on Distance Teaching and Learning* (pp. 1 - 6). Madison, WI: The University of Wisconsin - Madison.
- Rovai, R. P. (2004 5(2)). Blended Learning and the Sense of Community: A comparative analysis with traditional and full online graduate courses. *The International Review of Research in Open and Distance Learning* , [Online].
- Terry, N. M. (2008, 19(1)). Performance of domestic versus international students on the ETS exam. *Southwest Review of International Business Research* , 191-195.

**Table 1  
Independent Samples Test**

		t	df	Sig. (2-tailed)
TPE	Equal variances assumed	1.012	82	.315
	Equal variances not assumed	1.027	60.846	.308
AE	Equal variances assumed	-.351	70	.726
	Equal variances not assumed	-.355	68.936	.723

**Tables 2a & 2b  
Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.511(a)	.261	.224	100.562

a Predictors: (Constant), Age, Section, Gender, GPA

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	457.280	71.172		6.425	.000
	Section	32.718	22.191	.144	1.474	.144
	GPA	78.902	16.828	.460	4.689	.000
	Gender	-4.585	22.397	-.020	-.205	.838
	Age	2.483	1.823	.137	1.362	.177

a Dependent Variable: Total

**Tables 3a and 3b  
Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.578(a)	.334	.300	12.843

a Predictors: (Constant), Age, Section, GPA, Gender

## Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	.897	9.206		.097	.923
	Section	-4.774	2.855	-.156	-1.672	.098
	GPA	12.341	2.158	.535	5.718	.000
	Gender	.601	2.887	.020	.208	.836
	Age	.139	.233	.057	.594	.554

a Dependent Variable: Post





**Table 4**  
**Correlations**

		AE	TPE	Section	GPA	Gender	Age
AE	Pearson Correlation	1	.656(**)	-.186	.551(**)	.036	.170
	Sig. (2-tailed)		.000	.092	.000	.747	.125
	N	83	83	83	83	83	83
TPE	Pearson Correlation	.656(**)	1	.048	.600(**)	.139	.222(*)
	Sig. (2-tailed)	.000		.667	.000	.209	.043
	N	83	83	83	83	83	83
Section	Pearson Correlation	-.186	.048	1	-.040	.011	-.152
	Sig. (2-tailed)	.092	.667		.720	.925	.171
	N	83	83	83	83	83	83
GPA	Pearson Correlation	.551(**)	.600(**)	-.040	1	.016	.160
	Sig. (2-tailed)	.000	.000	.720		.886	.149
	N	83	83	83	83	83	83
Gender	Pearson Correlation	.036	.139	.011	.016	1	.167
	Sig. (2-tailed)	.747	.209	.925	.886		.132
	N	83	83	83	83	83	83
Age	Pearson Correlation	.170	.222(*)	-.152	.160	.167	1
	Sig. (2-tailed)	.125	.043	.171	.149	.132	
	N	83	83	83	83	83	83

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

