

An Experiment Comparing HBSE Graduate Social Work Classes: Face-to-Face and at a Distance

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This article describes a quasi-experimental comparison of two master's level social work classes delivering content on human behavior in the social environment. One class, delivered face-to-face, was largely synchronous. The other class, delivered using distance technologies, was more asynchronous than the first. The authors hypothesized that students would learn equally well in both classes, and did not reject that hypothesis. That was so even after accounting for strong explanation of achievement by grade point average adjusted for grade inflation. Though this study indicates that the distance education studied was apparently successful, the findings may not be highly generalizable, and the authors suggest that future studies need to look at achievement in various settings and curricular areas while carefully measuring and accounting for extraneous variables.

KEYWORDS *distance education, HBSE, human behavior, MSW, master, social work education, experiment, GPA, grades*

INTRODUCTION

Imagine that you are delivering a master's of social work (MSW) program on a vast 180,000 square mile plain with about nine people per square mile. The

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largest city on the plain has 175,000 people, lying with most of the other major cities on the eastern edge of the plain. Your MSW program is the only one on the plain, located in one eastern corner. In the more populated area to the east, there are MSW programs encroaching onto your service area with distance education (DE), but none to the west. To drive from your program to the most distant point in the plain, you would cover some 700 miles and spend about 10 hours driving even though most of the travel would be on largely traffic-free freeways. Further, in winter, travel is difficult at best and life threatening at worst. In addition to well-developed roads, infrastructure includes a network of electronic communications that reaches most of the plain. Further, your university has adopted the latest DE technology, administration and financial structure to support DE. Your MSW program, building on earlier experience, has been delivering MSW education combining DE with face-to-face (F2F) education for years.

However, doubts and disagreements regarding DE persist among your MSW faculty. They are aware of research that finds no difference in achievement of DE and F2F, but they doubt that it is always applicable to various areas of the curriculum. Therefore, when your department taught two similar MSW human behavior in the social environment (HBSE) courses, one F2F and one DE in the same semester, there was an obvious opportunity to conduct research on the issue. The hypothesis that there would be no difference in the achievement of these two HBSE classes is the subject of the research reported in this article.

LITERATURE REVIEW

While the availability of two comparable classes allows an approximation of an experiment, it is a quasi-experiment at best. We therefore reviewed literature that revealed what we know about DE compared to F2F educational achievement, and we established some relationships of extraneous variables and learning achievement that will help to offset methodological limitations. In brief, we identified general predictors of achievement that indirectly relate to our no-difference hypothesis and help to reveal the robustness of the relationship of DE versus F2F to achievement. These predictors include a pretest, time elapsed since baccalaureate degree, age, and grade point average (GPA), selected because they were available to us in student records.

Distance Education Versus Face-to-Face Delivery and Academic Achievement

Bernard et al. (2004) conducted a meta-analysis of the DE literature so comprehensive that there is little more for us to review. They analyzed 232

studies conducted between 1985 and 2002. Their results indicated that average effect size of DE versus F2F on student achievement was essentially zero, consistent with our no difference in achievement hypothesis. In fact, it appeared DE was slightly more effective than F2F. However, many DE applications outperformed their F2F counterparts and alternatively many performed more poorly. Shachar and Neumann's (2003) meta-analysis of DE as opposed to F2F and achievement favored DE more strongly, but we will rely on Bernard et al.'s large and careful study.

Bernard et al. (2004) further compared achievement outcomes by synchronous and asynchronous forms of education. They defined synchronicity by the time and place dependent nature of classroom instruction, with the most synchronous education offered simultaneously at one place. Asynchronous DE conditions are less so constrained. Bernard et al. found that mean achievement effect sizes for synchronous applications favored F2F instruction while effect sizes for asynchronous applications favored DE. However, they again found great variation in such findings.

In social work, achievement in DE also appears comparable to F2F delivery. Coe and Elliot (1999) found no significant differences in course grades between DE and F2F. Haga and Heitkamp (2000) reported similar baccalaureate GPAs between F2F and DE students. Wolfson, Marsom, and Magnuson (2005), though they relied on student perceptions of achievement and had an *N* of just 21, reported greater perceived achievement of learning objectives among DE students than F2F students in a field education seminar. Siebert, Siebert, and Spauldin-Givens (2006) reported student-perceived improvement of practice skills of MSW DE students. Wilke and Vinton (2006), in a comprehensive study of an online MSW program, utilized grades and student self-reports, and, found that grades and self-reports in F2F and online students were similar. Wilke and Vinton did find field instructor evaluations showed greater achievement among F2F students. Faux and Black-Hughes (2000), in one of the few studies measuring achievement via testing, reported an improvement from pre-to post-multiple choice test scores with DE delivery.

Post-Baccalaureate Time, Testing and GPA as Predictors

As we will show, our study found a noticeable difference between the treatment groups in time elapsed since earning a baccalaureate degree, making relevant various forms of maturation. McKenzie and Gow (2004) found that mature-age baccalaureate students, compared to dropouts, attained slightly higher grades in the first semester of university study, and had greater use of self-regulatory learning strategies. However, Dunlap, Henry, and Fraser (1998) found that MSW students without prior paid social work experience scored higher on an end-of-program comprehensive exam than did those with prior paid social work experience.

Because GPA is one of the variables utilized in this study, grade inflation, also maturation-related, is relevant. Rosovsky and Hartley (2002) reviewed literature that showed that across all institutional types and majors, baccalaureate GPA rose approximately 15–20% from the mid-1960s through the mid 1990s, rising about 0.027 GPA per year. Grade inflation moderated by the second half of the 1990s, because grades were approaching the upper limit of 4.00. Other carefully controlled studies are consistent on this issue. For example, Grove and Wasserman (2003) found a rate of inflation of 0.022 GPA per year in their study of a private university, while McSpirt and Jones' (1999) found an approximate rise of 0.021 GPA annually since 1983 at a public university. These latter studies, having controlled for actual student improvement over the years, are perhaps the more accurate on grade inflation.

GPA and prior tests are likely predictors of achievement, as various studies have shown. Bink, Biner, Huffman, Geer, and Dean (1995) found that prior GPA was a strong predictor of achievement for DE students, more so than attitudinal or other demographic variables. Blackman and Darmawan, (2004) found that baccalaureate GPA predicted medical student achievement. Evans, Goodson, and Schoffman (2003) found that scores on a licensing examination were highly correlated with GPA and admission test scores. Roberts (2003) found that pretest performance predicted achievement resulting from a web lecture. House and Johnson (2002) evaluated academic records of 236 graduate students enrolled in professional psychology programs at a large midwestern university. They found that eight courses resulted in grades that correlated significantly with advanced psychology test scores on the graduate record exam (GRE), among them three theory courses. Social subscores on the GRE advanced psychology test also significantly correlated with theory course grades.

In social work education, Dunlap, Henry, and Fraser (1998) reported on an investigation of the correlation between admissions criteria and academic performance of 654 MSW students at a state university. Test scores on a comprehensive exam taken by these MSW students prior to graduation measured academic achievement. Baccalaureate GPA and GRE scores significantly correlated with academic achievement. According to Dunlap, Henry, and Fraser, a regression model including age, race, work experience and gender indicated that GPA and GRE scores were the better predictors of achievement. Harrington (1999) found that GPA predicted achievement, but interacted with the type of delivery when graduate students took statistics F2F versus DE with computer technology.

Issues for Human Behavior in the Social Environment

Siegel, Jennings, Conklin, and Napoletano-Flynn (1998) pointed to growth in DE in social work by the mid nineties, with 41 of 259 programs having DE

offerings, and that HBSE was the most frequently offered curricular area. Moore (2005) surveyed 56 social work faculty and discovered that HBSE was taught at a distance more than any other social work content area. Nonetheless, evaluation of the DE delivery of HBSE has centered on the students' perceptions of the delivery method, rather than learning the content of HBSE (Barnett-Queen & Zhu, 1999; Johnson & Huff, 2000; Frey, Yankelov, & Faul, 2003).

Summary of Literature Reviewed

The literature we reviewed has suggested that DE can be effective for facilitating academic achievement. It also has suggested that the passage of time may be a factor, and that measures of prior achievement, particularly GPA and testing, might predict future achievement. Finally, study of DE and academic achievement for social work content, while showing achievement generally, has been lacking for HBSE despite frequent HBSE DE offerings.

METHODS

Given the findings of research reviewed above, we arrived at our research question, namely, is there a difference in achievement between F2F and DE HBSE education? We hypothesized that there would be no difference between DE and F2F HBSE classes. However, we were concerned that prior achievement, confounded by time, would influence academic achievement. This section will describe the variables, the differences of the DE and F2F classes, and the statistical analysis used in our study to test the no difference hypothesis and account for confounding variables. The analyses included comparison of means, correlation, regression, statistical significance, and effect size.

The Variables

Our study, designed after completion of the courses studied, selected variables that were available in student records. As indicated above, the available extraneous variables included a pretest, age, and time elapsed since baccalaureate degree and baccalaureate GPA. Using baccalaureate GPA and the date of graduation with that baccalaureate degree, we calculated inflation-adjusted GPAs. Following Rosovski and Hartley (2002), we set the national baccalaureate average GPA at 2.91 in 1972, increasing about 0.08 to 1979. All but one of our subjects graduated between the years 1979 and 2004. Between 1979 and 1995, we set inflation at 0.022 GPA per year. After 1995 until the last graduation date in 2004, we curtailed inflation to represent the approach to the limit of 4.00. From the resulting figures, we

adjusted GPA for each graduation year, as indicated across the 32 years relevant to our study in Figure 1.

The instructor of the two classes we studied had administered a pretest of the basic theoretical knowledge that students should have achieved prior to the course, as well as knowledge the students should gain in the course, and results were available to our study. Unreliable items were eliminated from this pretest to achieve a reliability of $\alpha = 0.70$. We replaced five missing pretest scores with mean values to allow inclusion of this variable for all students in the two classes, a strategy which should leave correlations unbiased but reduced in size and power (Buhi, Goodwin, & Nielands, 2008). As described below, we ultimately removed the pretest from the analysis.

We measured student achievement in the classes, the dependent variable for our study, by a total of scores for the assignments of the classes. This score was the score used to assign final course grades. The class assignments consisted of weekly presentations by students, as well as weekly multiple-choice quizzes, periodic multiple-choice exams, and a term paper.

The Classes as Treatment Groups

The independent variable in the hypothesis was the class type, DE versus F2F. The two class offerings shared many characteristics. The MSW classes originated from an eastern corner of the plain, beginning in January and ending in May. The subject of both classes was macro HBSE. Generally, the

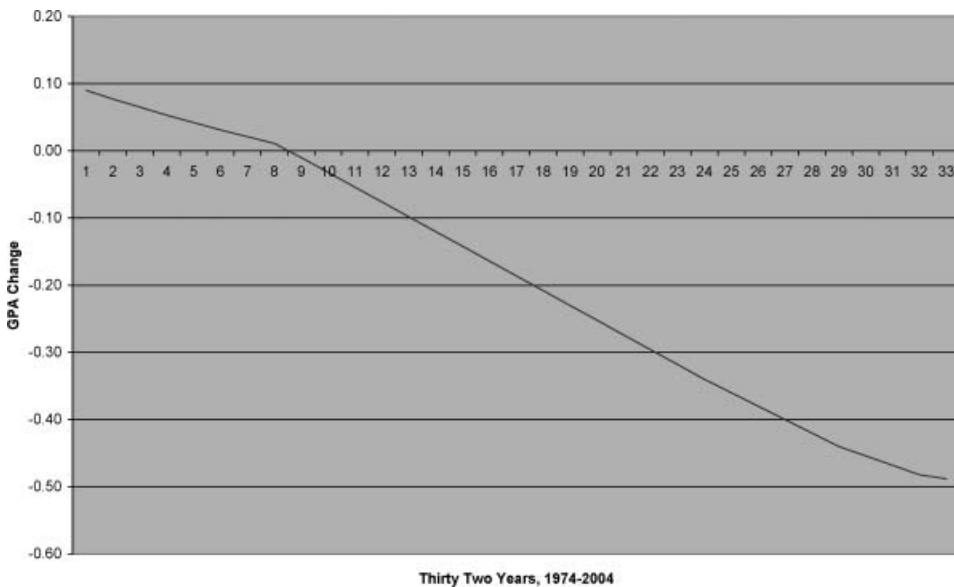


FIGURE 1 Amount of GPA Inflation Adjustment by Year Over 32 Graduation Years

courses emphasized theoretical concepts of an approach to systems theory called complexity theory. All students would have had a prerequisite HBSE course that included some content about systems theory. The classes used the same assignments, but students had some control of the content of class activities via student participation in groups to develop specific examples of assigned concepts. Students' undertook activity centered on individual student presentations of the exemplified concepts. The classes were similar in size and had the same instructor. Both classes used a computerized class platform, Blackboard, to supplement instruction. The instructor posted all standard information on Blackboard for both classes. Students who missed time-synchronous classes were required to post their work on Blackboard. Both classes had at least some students who commuted substantial distances to attend classes. Though somewhat similar, the classes also differed substantially.

The F2F students were considered full time. The F2F class was offered in a traditional synchronous format, with live class interaction in the physical presence of the other students and the instructor. It met in this person-to-person mode for a total of about 30 hours, two hours weekly over the 15-week semester. Student workgroups were able to meet in person as they chose. The instructor used Blackboard for sharing established information for the most part, and for occasional asynchronous student interaction.

The DE class consisted of students considered part time. They had all met one another in on-campus classes during the previous summer. The students met synchronously by time, but not by space, over interactive television for about 15 hours over the course of the semester, meeting alternate weeks. Some of the students in that class attended in the room where the instructor was located, and the remainder were scattered in other interactive television rooms in clusters from one student to half a dozen, sometimes hundreds of miles distant from each other. The instructor used Blackboard extensively and asynchronously, presumably substituting on-line interaction equivalent to the reduced student meeting time compared to the F2F class, 15 hours compared to 30 hours. Students would asynchronously organize and then present their work on Blackboard in weeks when there was no time-synchronous interactive television meeting.

Clearly, the two classes had neither random assignment nor were a random sample. Rather, application to and acceptance in either program determined who was in each group. Thus, we cannot assert equalization of the important extraneous variables by random assignment, or representation of a larger population.

Significance and Power

In this article, we conventionally set the acceptable level of statistical significance at .05. Significance addresses the probability of making a type I

error, which is rejecting a null hypothesis that is true, with 95% certainty at the .05 level. Power assesses the probability of making a type II error, failing to reject a false null hypothesis. Given that the null hypothesis of no difference in achievement is central, we would want to avoid that error. With our sample of 44, to reject the null hypotheses with 95% certainty we would need to explain more than 25% of the variance in achievement with the DE versus F2F variable.

The quasi-experimental design compared the two forms of class offerings, but also utilized other available variables that might predict learning and interact with the form of class offering. We used bivariate analysis, the differences of means and correlation, to describe the differences of the two classes. In addition, we used linear regression analysis including the type of class and the two forms of GPA to predict achievement of all students in the two groups. Because the number of cases limits the number of viable variables in a regression analysis to two, we used bivariate relationships and the grade adjustment procedure to arrive logically at the variables entered in the regression.

RESULTS

The comparison of means between F2F and DE, and the regression model that included F2F versus DE as a dummy variable, both suggested that F2F versus DE had little or no impact on achievement. Most of the means of the variables for the two classes are very similar as can be seen in Table 1. The average age, baccalaureate GPA, adjusted baccalaureate GPA, pretest score and total points for the course did not differ significantly. The only significant difference of means in the two groups was the time since receiving the baccalaureate degree. Correlations of the total points with the two forms of GPA, as well as the pretest, were significant.

The spread of total points for all course work for the 44 students was 125 to 189. As Table 1 shows, the mean total score for the both groups was

TABLE 1 Comparative Statistics of the Face-to-Face and Distance Education Classes

Variable	F2F Mean (SD)	DE Mean (SD)	t^1	p^1	r with total points	p of r
Age	34.8 (12.0)	37.1 (9.1)	.70	.48	-.08	.63
Undergraduate GPA	3.23 (.40)	3.15 (.43)	.63	.53	.45	.00*
Adjusted undergraduate GPA ²	2.76 (.40)	2.63 (.38)	-1.16	.25	.56	.00*
Pretest score	16.3 (4.21)	15.0 (3.76)	1.07	.29	.32	.04*
Years since degree	4.3 (7.05)	12.1 (8.17)	3.38	.00*	.16	.31
Total course points	156.1 (18.1)	156.0 (9.9)	-.02	.98	1.00	

¹Significance of difference levels and t values assuming equal and nonequal variance are nearly identical.

²Adjusted for inflation to 1980 standard.

*Significant at $p = .05$

156, but the F2F group had a larger standard deviation. An independent *t* test was conducted and even assuming unequal variance there was no statistically significant difference between the total points of the groups ($t = -0.02$, $df = 30$, $p = .98$). The lack of a difference in total points supports our hypothesis of no difference. Of the remaining predictor variables available for the analysis, time since receiving a baccalaureate degree was the only variable showing significant difference ($t = 3.38$, $df = 42$, $p = .00$) between the two class groups, with a mean of 4.3 years for the F2F group, and 12.1 years for the DE group.

As indicated in the last two columns of Table 1, both measures of GPA as well as the pretest score significantly correlated with total course points. The pretest score is also weakly associated with the baccalaureate GPA measures ($r = 0.13$ and 0.19 respectively), so we conducted a regression analysis to see if pretest could add to the explanation of total course points by GPA (data not shown). The variance explained was increased by several percentage points by the pretest in this regression, but the beta value for the pretest was insignificant. Given that finding, and the fact that we needed to limit our regression to two independent variables, we did not consider the pretest variable in further analysis.

Because time since graduation varied by group, and baccalaureate GPA correlated with achievement, these variables might interact through grade inflation to affect achievement. To examine any combined influence of GPA, grade inflation, and delivery method, we developed and presented two linear regression models in Table 2. The first model uses the baccalaureate GPA values as they appeared in students' records, and the second model uses the inflation-adjusted baccalaureate GPA. As Table 2 shows, the inflation-adjusted model is considerably stronger, explaining 29% of the variance of total course points compared to just 16% in the unadjusted model. The 29% of variance explained in the second model is in excess of the 25% designated power level and calls for examination of the various beta weights. Adjusted baccalaureate GPA had a statistically significant beta weight of 0.57 with baccalaureate GPAs indicating strong explanation of

TABLE 2 Regression Models of Student Achievement as the Dependent Variable

Model	Variable	Std. Err.	Beta	<i>t</i>	<i>p</i>
1 ¹	Undergraduate GPA	4.84	.45	3.22	.00*
	Class (F2F = 0, DE = 1)	3.94	.04	.29	.78
2 ²	Adjusted undergraduate GPA ³	4.78	.57	4.38	.00*
	Class (F2F = 0, DE = 1)	3.69	.10	.75	.46

¹Adjusted $r^2 = 16\%$, standard error = 13.

²Adjusted $r^2 = 29\%$, standard error = 12.

³Adjusted for inflation to 1980 standard.

*Significant at $p = .05$.

achievement in the classes. The delivery method, F2F/DE, had an insignificant beta of 0.10, and it did not increase the 29% of the variance explained, so it cannot contribute to the required 25% power level for rejecting the null hypothesis with 95% certainty. Thus, neither power nor significance is sufficient to reject the hypothesis of no difference in achievement between the two class types.

DISCUSSION

With our hypothesis that there would be no difference in achievement between DE and F2F left standing, our study suggests that the knowledge content of HBSE in social work education will lend itself to the varying delivery methods we studied, at least so far as students' learning our content in the context we described. We further found that student ability represented by GPA, not the differences of DE and F2F (including differing degrees of synchronicity), is likely to explain achievement. Indeed, the most important explanatory factor, baccalaureate GPA, preceded students' entrance to one program or the other.

Second, the presence of differing student backgrounds such as time since baccalaureate degree has implications for research comparing educational delivery. In our case, the inflation of baccalaureate GPA was more than a standard deviation over the graduation dates studied. DE researchers need to be aware of the possibility of selection bias of enrollment into various groups. They should collect data on background variables that describe possible differences, and account for those variables if their measures, like time since baccalaureate degree in our case, vary with groups. We would further expect relevant variables to vary from one setting to another. For example, an urban setting might not select experienced students into DE programs.

Third, we recognize that our study, in a unique region of the country and studying HBSE teaching, is not readily generalizable to other geographical or curricular areas. Thus, our attention to power and significance has more to do with how we will generalize the research into our environment for teaching graduate level HBSE than it does for generalization into other environments or content areas. We would submit that any transfer of understanding to other settings should be done in relation to comparable course content, namely advanced macro HBSE content. Micro practice content learned through F2F role-play for example, might have considerably different achievement results in a DE versus F2F comparison.

The above third point however, emphasizes the shift in the issues regarding DE evident in our study and the literature we reviewed. The issue is no longer whether DE can be successful, because it is obvious that it can

be. As Shachar and Neumann, (2003) say, the question might as well be whether F2F can succeed. It is also consistent with Rooney, Hollister, Freddolino, and Macy's (2001) call to move from DE versus F2F studies to emphasis on course content. As we see it, the issue now is what mix of delivery methods will make education successful. Wisher and Fletcher (2004) argue that making education completely asynchronous, as automated computer tutoring can do, would in fact provide the best conditions for learning next to one-on-one human tutoring. While varying forms of content would be more or less adaptable to automation, computer technology allowing asynchronous discussion as described in our article can be quite amenable to social work knowledge. However, Harrington (1999) found that low-GPA MSW DE students, compared to MSW F2F students, did not do well when using technology to study statistics. Thus, research on social work education needs to center on the question of the appropriate methods for the students, context and content at hand.

CONCLUSION

The mix of pedagogy and content has been a matter of tradition and convenience. Our bias toward F2F educational delivery is probably rooted in biology and culture that have left us desirous of human contact. Bias is probably also rooted in the traditional campus structure where professors and students conveniently walked to class but could not conveniently contact each other by other means. While our desire for human contact no doubt continues, the inconvenience of distant contact does not. Bernard et al. (2005) say that F2F is favorable to attitudes about education. However, DE can generate positive attitudes with communication and active learning (Shachar & Neumann, 2003; Stocks & Freddolino, 2000; Bernard et al., 2005). Therefore, we might look for such techniques to enhance comfort with DE when we use it.

Should we use DE? From our corner of the great plain, it would seem unjust to deprive potential social workers, and their potential clients, of a good social work education when we can deliver it at a distance. So yes, we should deliver education at a distance where it works. However, we should fill in the details, course by course, about how we can deliver our education well, and we suspect that that will require a variety of pedagogical methods.

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