Preparing Teachers for Diverse and Exceptional Student Populations—Textbooks Still Make a Difference

Authors: Dr. Sid T. Womack

Dr. Shellie L. Hanna

Publication date: July 1, 2010

Preparing Teachers for Diverse and Exceptional Student Populations—Textbooks Still Make a Difference

How much difference in candidate learning do textbooks make? What's a professor to do when his student evaluations over a period of years indicate that the students are not happy with *any* choice of a textbook? We are not the first faculty to ponder those questions. Add to those questions the issue of sometimes exorbitant textbook prices, and for conscientious college teachers, this is a topic worth examining.

The immediate focus was on an undergraduate course in teacher education designed to acquaint pre-service teacher candidates with diversity concepts. This course at our university was taught for the first time in 1987 and has continued in various forms since then. It is a major source of information for candidates to accomplish NCATE Standard Four (Diversity). One of the provisions of the *Education of the Handicapped Act of 1975* required that teachers be made aware of the law and of information about individuals with exceptionalities. Universities today meet these requirements through dedicated courses (our university's choice), through parts of others courses, or by seminars during the internship.

Nature of the Problem

This paper was written to solve two problems.

1. The first problem was determining the most effective teaching format for undergraduate teacher candidates in a course on educating exceptional learners, including the determination of the usefulness or lack thereof of a textbook.

2. The second problem was associated with the need to insure that formats and assessments were not biased in regard to gender. This was of interest especially for a university maintaining accreditation with the National Council for Accreditation of Teacher Education (NCATE) as it pertains to both Standard Two (Assessment) and Standard Four (Diversity). Did any of these three teaching formats favor one gender of teacher candidate more than another?

In teaching an introductory exceptionalities course over the past 23 years three formats have been utilized: (1) compressed video television with mainly textbook backup. (2) lecture with transparencies and textbooks as secondary backups; (3) lecture with Power Point as a major feature and some web-based backup and no textbook. The third choice was arrived at as a possible cost-saving measure for students. Instead of using textbooks, we developed over 43.8 megabytes of Power Point presentations and other electronic study materials. The Power Points were often printed by students in note-format with six slides per page, and students brought their printouts with them to class. Printing Power Point slides was much more economical than purchasing textbooks at the current price of $138. No adverse effect of removal of a required textbook from this course has been demonstrated in relation to the Praxis III (which is an NCATE accreditation requirement). Every candidate has passed.

Research questions:

1. Was one of these formats more effective in terms of undergraduate teacher candidate achievement in an exceptionalities course?

2. Was one of these formats more effective in terms of undergraduate teacher candidate achievement with gender as a second independent variable?

Null hypotheses:

1. There will be no ($p<.05$) difference of the effectiveness of three learning formats in special education content achievement.

2. There will be no ($p<.05$) difference in the effectiveness of three learning formats between male or female undergraduates between three different learning formats.

Definitions:

1. Learning formats--(a) compressed video television with textbook backup; (b) lecture with transparencies and textbooks as secondary backups; and (c). lecture with Power Point as a major feature and some web-based backup and no required textbook.

2. Achievement: A composite total score of points earned from assignments and examinations over the diversity content in the courses. The range of possible points was from zero to 800 points. The assignments and examinations reflected the usual diversity content of most introductory courses in undergraduate teacher preparatory courses. Candidates studied the federal and state systems for educating diverse populations that had evolved from court case histories, federal and state laws, and best practice procedures. They learned of cases in diversity from faculty, from textbooks, videotapes, and from nine journal readings.

Literature and *A Priori* Knowledge

About 85 percent of teacher-preparatory universities teach teacher candidates about exceptionalities through a dedicated special education course. Data from the mid-90s indicated that the remaining 15 percent try to infuse exceptionalities content as part of educational psychology courses, test and measurement courses, human development courses, or as seminars during student teaching. Our university experimented with teaching exceptionalities during the fall of 1986 in a one day "crash" course. Since that event, this university has taught this content as a special course.

Skills and attitudes about exceptionalities are required to be in the curriculum by the National Council for Accreditation of Teacher Education. Our state is a co-accreditation state. That is, our state will not accredit a teacher preparation unit until it has already been recognized (accredited) by NCATE.

Current research tends to indicate that when studying gender differences, there is little or no difference in the level of academic achievement between males and females. However, *how* they learn may differ. One study has recently researched the verbal skills of girls and boys and supported the idea that the areas of the brain that control verbal skills work at a more intense level in females than males (Burman, Bitan, and Booth, 2008). Additionally, the study reported that males who learned information by hearing had more difficulty on tests with writing as compared to ones that were oral. Boys who learned information by reading by performed better on tests that were written and more difficulty on oral tests. For females, the differences did not seem to matter. Adebayo (2008) says that both entering freshman and graduating students at the undergraduate level are now predominately female. Therefore, research to determine if there is a

difference in why females are both entering and completing the university experience is suggested by current literature. The question arises to whether there is truly a difference in the way the students are learning or achieving that may lead to some of these findings. Given what we know about gender differences, is there a difference in how much male and female students learned about exceptionalities between these three formats?

Procedures and Instrumentation

This study was done within the unique parameters of action research in education. Action research attempts to solve local problems, utilizing the technologies sometimes used in more rigorous, theory-creating research. Wide geographical generalizability of results is not usually an intent for action research, nor was it the intent of this particular study. Rather, we had a specific purpose of determining how to most effectively help students at our university. The findings obtained in this study can be applied to class situations on this university campus as long as the demographics of the students do not change much.

During the time this study was ongoing, there were no changes in entrance requirements to our university. Nor were there any changes in requirements for admission to teacher education. There were test item pools for the examinations which changed very little during the duration of the study. The same textbook, although in different editions, was used during both l semesters. Test items reflected content from state and national standards for the beginning licensure of teachers, and those standards did not change. The rubric utilized for grading the major paper in the class did not change. The procedure for grading the one-page professional readings also do not change.

The extent of content knowledge learned about exceptionalities was determined by obtaining scores of students on examinations, a Research Awareness Project (term paper), and four one-page professional readings. Data used were grade book data from an exceptionalities course taught to distance-learning students who participated in a compressed-video delivered course in a summer session, their virtual classmates who attended the same course in "real time" on campus, and students in the same course taught in a later summer in which used Power Point and web pages were used, but no textbook. The content of the course could not be described as totally static between the compressed video-on campus summer session and the subsequent no-textbook course, but nearly so. Other than for cosmetic changes needed to conform to accreditation requirements, content reflected on the syllabi was the same. The basic natures of mental retardation, giftedness, learning disabilities, and other exceptionalities have not changed. A few laws have been passed and a few court cases have been ruled on during the time frame of the study, so the students in the more recent sections of the course have had a little more content to deal with. Content on the examinations came from the lectures, textbooks, videotapes, and readings.

Reliability and Validity

All three examinations in the courses were checked for reliability and item analysis. Reliabilities were all above .70 and most instances were above .80. Item analyses were also performed and points replaced for items that were negative discriminators, miss-keyed, or untaught items. For 200 of the 800 points, candidates wrote a Research Awareness Project in reference to a rubric. The split-half reliability of the major project in the course, the Research Awareness Project, was 0.92746, significant at the 0.0001 level with 230 pairs of data gathered

over 13 semesters and reported elsewhere. The eight parts of their rubric, and hence eight parts of the RAP, were mapped to state standards for the beginning licensure of teachers, which in turn were mapped to Council for Exceptional Children standards. The curriculum content was mapped to state standards for beginning teaching licensure.

The total number of points available in the course was 800. Grade brackets were at 730-800 for an A, 650-729 for a B, 570-649 for a C, 490-569 for a D, and less than 490 was an F.

Table 1

ANOVA for Total Points attributable to formats, gender, and interaction

Source	DF	Sum of Squares	Var. estimate	F	Critical F	p
Model	5	35439.44280	7087.88856	9.45	2.48	<.0001
Error	36	27003.62863	750.10080			
Corrected Total	41	62443.07143				

R-Square	Coeff Var	Root MSE	TOTPOINT Mean
0.567548	3.820942	27.38797	716.7857

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Gender	1	14089.74931	14089.749	18.78	0.0001
Format	2	18813.91202	9406.956	12.54	0.0001
Gender*Format	2	2535.78147	1267.891	1.69	0.1988

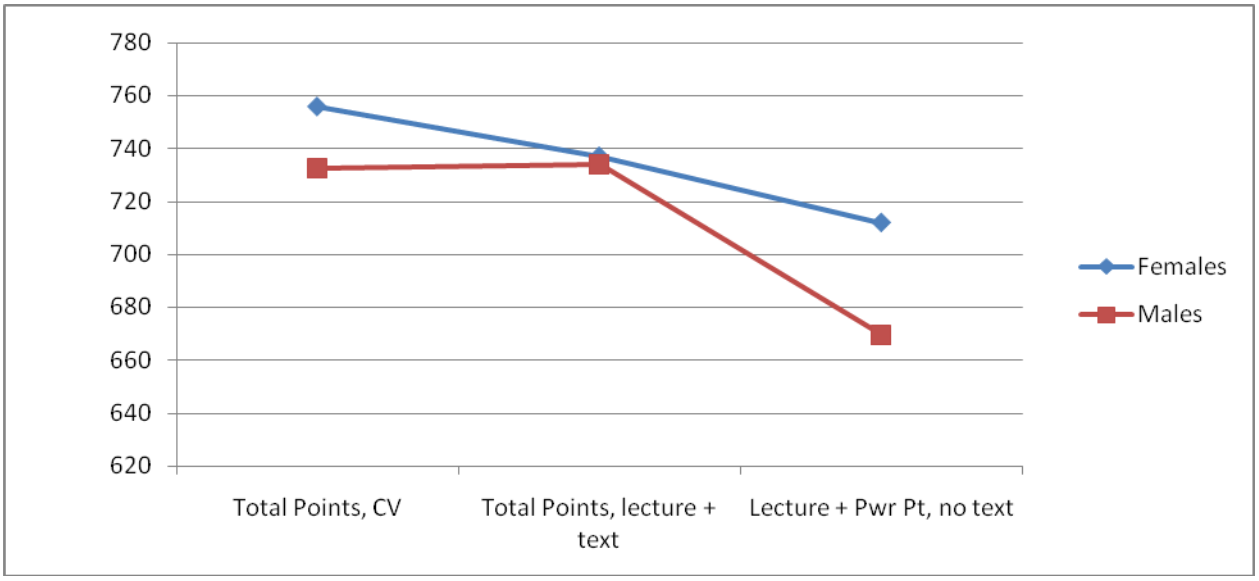
The lack of a significant F for the interactions of gender and format indicated that no format adversely favored one gender over the other. However, the high significant Fs for gender

alone and for format alone spurred further investigation. The large amount of variance explained by the model, 57 percent, also indicated a power main effect or main effects.

A T test with gender as an independent variable indicated that females outscored the males no matter which format was used, 731 points to 693 ($t=-3.30$, $p<0.0026$). Much of the learning in the course is verbal content. Regarding the format issue, further exploration with the Least Significant Difference technique (Hatcher & Stepanski, 1994) and Scheffe's test indicated that both males and females achieved less, as evidenced by scoring fewer points, when taught without the textbook (Figure 1).

Figure 1

Achievement in college course diversity content between males and females in three formats



The difference of 23.42 points between males and females in the compressed video format in which both were at the far site had no statistical implications. For the males and females taught by enhanced lecture and textbooks at the near site, the difference of less than two points out of a possible 800 was also not significant. The difference of 64.4 points between males in enhanced lecture with textbooks and in Power Point lecture without textbooks was

statistically and practically significant. With the grade brackets set at 70 points, that is almost a letter grade. Table 2 depicts the means of the three situations in numerical form:

Table 2

Achievement means of students taught in three formats

	Total Points, CV	Total Points, lecture + text	Lecture + Pwr .Pt, no text	Row means
Females	755.75	736.92	711.89	731.15
Males	732.33	734	669.6	693.44
			Grand mean --->>	716.79

Discussion and Recommendations

A statistically significant difference was found between three teaching formats in favor of teaching with compressed video, lecture, and the textbook. The compressed video data originated when a course taught at our university was transmitted by compressed video to a classroom at a community college in the same state. These findings seem confirmatory of the Burman, Bitan, and Booth (2008) study about information processing in males and females. In question would be the need to make the textbook mandatory for the introductory exceptionalities course students instead of optional, as is now the case. If they wish to purchase the text, they

still may. It costs $138 new. For that amount of money, many students have elected to attend class faithfully and print the Power Points.

We noted that all three means were well above 80 percent of those available in the course. This indicates that on the average, students in this class are achieving a mastery level of the material on exceptionalities that they are studying. Our graduates are doing well on their Praxis III exams, not one of them having failed in 9 years. Their test profiles on the Praxis III do not show any unusual weaknesses related to their understanding of exceptionalities and/or diversity issues. Given these practicalities, the current methodology utilized in the course will remain the same except for timely updates. Male students will be encouraged, though not required, to obtain the textbook for the course since the omission of the textbook seems to have an disproportional and adverse effect upon them.

References

Burman, D. D., Bitan, T., & Booth, J.R. (2008). Sex differences in neural processing of language among children. *Neuropsycologia, 46*(5), p. 1349-1362.

Ferguson, G. A. (1976). *Statistical analysis in psychology and education, 4th ed.* New York: McGraw-Hill.

Hatcher, L., & Stepanski, E. J. (1994). *A step-by-step approach for using the SAS system for univariate and multivariate statistics.* Cary, N. C. SAS Institute, Inc.

Gay, L. R., & Airasian., P. (2000). *Educational Research; Competencies for analysis and application, 6th ed*. Upper Saddle River, N. J.: Merrill-Prentice-Hall.

Guilford, J. P., & Fruchter, B. (1973). *Fundamental statistics in psychology and education, 5th ed*. New York: McGraw-Hill.

Hays, W. L. (1981). Statistics *3rd ed*. Chicago: Holt, Rinehart and Winston.

Heiman, G. W. (1996). Basic *statistics for the behavioral sciences, 2nd ed*. Boston: Houghton-Mifflin.

Senter, R. J. (1969). *Analysis of data: Introductory statistics for the behavioral sciences*. Dallas: Scott-Foresman.

Steel, G. D., & Torrie, J. H. (1960). Principles *and procedures of statistics with special reference to the biological sciences*. New York: McGraw-Hill.

Wampold, B. E., & Drew, C. J. (1990). *Theory and application of statistics*. New York: McGraw-Hill.