MIXED METHOD INSTRUCTION ACROSS BUSINESS DISCIPLINES

by

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ABSTRACT

Thirteen statements were all linked to one or more empirical studies found in the instructional methodology literature. The students completed a voluntary survey that contained demographic questions and 13 empirically linked statements on teaching practices students "believed helped them learn better." A Promax (Oblique) rotation revealed three factors with five of the nine retained variables loading above .60. The final communality estimates (h^2) were also high. A two-way MANOVA test revealed significant differences among declared majors and non-business majors on all three factors combined. Business majors differed significantly with non-business majors on their perceptions of dyad and small group learning.

INTRODUCTION

The methods of teaching and pedagogical practices, supported by empirical research, are far too many for any teacher in a specific discipline to master and implement in the classroom. According to Svinicki (2000) research in teaching and classroom learning is overwhelming even for those who specialize in the field of teacher education. Thousands of studies have been conducted. Scholars have written compendiums covering decades of research in education and reviewing nearly 2,600 studies (see Pascarella and Terenzini (1991) and Feldman and Newcomb (1969) for examples). Nearly all recognized areas of learning and teaching have been researched. The cognitive, psychomotor, and affective domains first introduced by Bloom and his colleagues (1956) have been discussed, studied and implemented by classroom teachers. Teachers plan lessons and establish performance or behavioral objectives based on some level of cognitive, affective, or psychomotor learning they would like for students to achieve.

There are endless varieties of strategies and tools instructors can use in pursuit towards more effective teaching: Students can be placed in pairs (dyads) for the purpose of enhancing learning; teachers can use student-led discussion groups to cover meaningful topics; teachers can use cooperative or collaborative learning groups; teachers might use the full lecture, enhanced with two five minute breaks in the middle and at the end of their large lecture classes; teachers might select a 20 to 30 minutes mini-lecture format with break-out sessions for his or her class; the teacher might quiz students at the beginning of class once or twice per week to create a more suitable attitude towards the course content and to verify that students have read assigned readings prior to class; teachers might grade homework in class to assure students completed it; teachers might assign students to groups and require a presentation on a specific topic. All those

methods may be effective or they may not. Certainly, the effectiveness of many of teaching practices is supported by empirical research.

Cross (1999) offers a critically important overview in an article titled, *What Do We Know About Students' Learning, And How Do We Know It?* After thoroughly examining the major issues in students' learning, she offers a suggestion:

> That research, however, is going to require of all of us a deeper level of understanding than the research of the past. Research should become the working partner of both our own experience with learning and focused conversations about learning with our colleagues. If we are taking learning seriously, we will need to know what to look for (through research), to observe ourselves in the act of lifelong learning (self reflection), and to be much more sensitively aware of the learning of the students that we see before us everyday (1999: 269).

Students' learning is critically important to the teacher and the student. Teachers derive satisfaction from student learning. However, it is important that the teacher knows if what he or she does in the classroom is effective. The question then becomes: *What are the best methods for classroom instruction and student learning?* Although there are no "magic bullets" in teaching (meaning there are no cookie cutter approaches to what all teachers can do to maximize student learning at all times), there are demonstrated practices that work better than others.

Positive reinforcement, avoidance learning, punishment, and extinction, does work. Quizzing students to motivate reading is a good use of partial reinforcement theory. An "A" to "F" grading scale structured in the correct course design works as a positive motivating factor. Teacher "wait-time" after asking a direct question works better than when the teacher does not wait for a student response. Teachers' praise works. Student-led discussion groups work. The

Socratic method, a systematic teacher-led question and answer routine, can be used to guide students to a known conclusion if done correctly. There are many research supported classroom practices that work to aid the teacher in facilitating student learning. However, the problem does not lie in the credibility of the research studies. The problem is in determining the effective application of accepted teaching practices for any one teacher.

PROBLEM

The problem faced by most classroom teachers is three-fold: (1) Students must be diagnosed properly early in the semester for determining the range of the ability differences; (2) teachers must attempt to accommodate the range of ability differences and offer instruction that assures learning across that range; and (3) teachers are faced with learning style difference in both the homogenous and heterogeneous classroom; whereby at least a significant percent will not learn the content with a particular type of instruction in the first attempt. Generally it is thought that the teacher should employ an array of teaching methods and practices. This advice seems logical.

The approach of using an array of methods and practices is a problem for the teacher; a finite amount of time for grading, teaching, researching and serving prevents trial and error approaches. Busy teachers need to know what works best for themselves most of the time. Among the hundreds of methods determined useful in the research, what, if any, is there an optimal combination of methods that could be deemed most effective for the teacher at the college level? The problem faced by college level business teachers is that many do not know where to start. Hence, this study began a process of sorting through a hand-full of teaching methods routinely practiced by three college professors that students perceive contributed to their own learning. The research study had a few limitations and delimitations.

LIMITATIONS AND DELIMITATIONS

The study was limited to the perceived learning preferences of students at a medium size regional institution of higher learning. The thirteen original statements reflect a very small number of potential teaching methods available for instructors to use in business classrooms. No attempt was made to address all available methods for instruction; furthermore, the thirteen statements selected for this study merely reflect the preferred combined teaching methods routinely practiced by the three authors. The study results should not be generalized to any population other than the approximate 1,000 business majors sampled at the medium size university. It is also assumed that the findings are valid for all race classification for the total population sampled due to the fact that student perceptions were measured pertaining to teaching practices supported by research findings at all other types of institutions for higher learning. In addition to what has already been mentioned, specific procedures were addressed.

PROCEDURE

Eight classes were used in the study (two *Introduction to Business* classes, two *Business Communication* classes, two *Principles of Microeconomics* classes and two *Personal Finance* classes). The three instructors asked their own students to complete a survey during the Fall and Spring 2003 semesters. The survey was strictly voluntary. Students who volunteered received bonus points for completed surveys. Two hundred thirty-eight students completed a survey containing 13 statements on teaching methods (related to empirical research and routinely practiced by the three authors) and several demographic items. As shown in *Appendix A*, the students responded to a five-item Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Three(3) was used as the (neutral) term. Table 1 shows related works that could be linked to each of the statements as a rationale for their use in classroom teaching practices.

Table 1

Statements and Empirical Links

S1: *I learned the subject better when the instructor lectured on a topic for 15 to 20 minutes:* Daniel, Joseph 1999; Goff-Kfouri, Carol Ann 1999; & Hearn, Ralene 2002.
S2: *I learned the subject better when the instructor placed students in dyads (two students) to practice vocabulary:* George, P. G. 1994; Windschitl, M. 1997; Cardona, C., & Artiles, J. 1999; Klein, J. D., & Cavalier, J. C. 199?; Wickett, M. S. 2000; Elfers-Wygand, P. & Seitz, J. A. 1998.
S3: *I learned the subject better when the instructor placed students in small groups composed of three to five members to solve a case outside of class:* Lewis, H. A. 1979; Sawyer, J. K. & Medlin, J. 2002; McKenney, K. & Graham-Buxton, M. 1993; Thompson, J. & Soyibo, K. 2002; Flynn, A. E. & Klein, J. D. 2001.
S4: *I learned the subject better when the instructor placed us in student-led discussion groups in class to talk about various topics:* MacPherson, R., Jones, A., Whitehouse, C. R. & O'Neil, P. A. 2001; Fleck, A. 1999; Christianson, R. G. & Fisher, K. M. 1999; Maher, R. J. 1998; Aamodt, M. G. 1983; Cruz, M. G., Boster, F. J., & Rodriguez, J. I. 1997; Conrad, J. M. & Conrad, P. L. 1993; Cummings, A. 1995.
S5: *I learned the subject better when the instructor used the Internet to reinforce main points.* Sawyer, J. K. & Medlin, J. 2002
S6: *I learned the subject better when the instructor gave a "review" at least a week before an examination:* Cummigs, A. 1995; Powers, D. E. & Fowles, M. E. 1998; Cottell, P. G., Jr. 2000; Bol, L. & Hacker, D. J. 2001.
S7: *I learned the subject better when the instructor required students to write-out all vocabulary words and definitions by hand:* Operant Conditioning: Avoidance Learning (Negative) Reinforcement. Skinner, B. F. (1969). Contingencies of Reinforcement. New York: Appleton-Century-Crofts; Bandura, A.
S8: *I learned the subject better when the instructor graded homework in class:* Operant Conditioning: Avoidance Learning (Negative) Reinforcement. Skinner, B. F. (1969). Contingencies of Reinforcement. New York: Appleton-Century-Crofts; Bandura, A.
S9: *I learned the subject better when the professor tested students over three chapters from the textbook rather than five:* Expectancy Theory--Vroom, V. H. (1964) Work and Motivation. New York: Wiley.
S10: *I learned the subject better when the instructor gave students two or more chances to redo an assignment:* Expectancy Theory--Vroom, V. H. (1964) Work and Motivation. New York: Wiley.
S11: *I learned the subject better when the instructor called on students by name to answer specific questions:* Internal Locus of Control. Szilagyi, A. D., Jr. & Sims, H. P. Jr.,1975; Anderson, C. R. 1977; Lefcourt, H. M., Martin, R. A., & Saleh, W. E. 1984.
S12: *I learned the subject better when I was given an assignment to be completed on my own:* Internal Locus of Control. Szilagyi, A. D., Jr. & Sims, H. P. Jr.,1975; Anderson, C. R. 1977; Lefcourt, H. M., Martin, R. A., & Saleh, W. E. 1984.
S13: *I learned the subject better when the instructor required a group presentation:* MacPherson, R., Jones, A., Whitehouse, C. R. & O'Neil, P. A. 2001; Fleck, A. 1999; Christianson, R. G. & Fisher, K. M. 1999; Maher, R. J. 1998; Aamodt, M. G. 1983; Cruz, M. G., Boster, F. J., & Rodriguez, J. I. 1997; Conrad, J. M. & Conrad, P. L. 1993; Cummings, A. 1995.

RELATED LITERATURE

A search for related literature regarding Statement 1 revealed no studies that directly confronted a question of mini-lectures related to students' perceptions of their own learning; however, Daniel (1999) used a mini-lecture series as an instructional method for the delivery of interactive computer aided instruction. Goff-Kfouri (1999) used the mini-lecture in problem solving scenarios. Hearn (2002) made teaching outlining in a basic speech course more interesting for students with mini-lectures. Related studies were found in the literature which support Statement 2.

A few studies could be used to link Statement 2 and the use of dyadic teaching practices. George (1994) compared selected cooperative learning methods (drill and review dyads) among 61 undergraduates enrolled in 2 psychology classes and showed the cooperative group performed better than the con-cooperative group on measures of achievement. Windschitl (1997) examined the relationships in achievement between members of dyads paired according to epistemological maturity. Cardona & Artiles (1999) showed that performance was higher for peer tutoring dyads than for heterogeneous small groups. Klein & Cavalier (1998) found that fifth and sixth grade students performed better in dyads than as individual with computer based learning. Wickett (2000) found that dyads and group discussions can build confidence in all students. A hand-full of studies validated the link between Statements 3, 4, and 13 and the use of small groups, discussion groups and student-led discussion groups as valid teaching practices.

Statement 3, 4 and 13 all are linked to the literature. The statements represent the use of small-groups as a legitimate teaching practice. Lewis (1979) compiled five studies on the advantages and disadvantages of group learning. Sawyer & Medlin (2002) enhanced students' learning by requiring small groups of Accounting students to collaborate on case studies

downloaded from the course Web site. McKenney & Graham-Buxton (1993) determined that small groups could be interwoven into a large lecture class of 225 Sociology students for positive results. Thompson & Soyibo (2002) found that practical work in small groups and discussions improved students' attitudes towards Chemistry. Flynn & Klein (2001) found that when students worked in groups to complete cases, they felt they learned better than those who worked alone. MacPherson, Jones, Whitehouse, & O'Neil (2001) found that small group learning in final year medical student led to students wanting discussions with tutors to be an exchange with the tutor acting as expert. Fleck (1999) discussed how small groups of students were more inclined to ask questions and help one another clarify their thinking. Christianson & Fisher (1999) found that students understood diffusion and osmosis more deeply in the constructivist, small discussion group format, than in the traditional lecture. Maher (1998) provided evidence that small groups and cooperative learning could be integrated into large lecture classes and explained what works well and what does not work well. Aamodt (1983) surveyed 180 college students at all levels and found each level preferred small group discussion activities over materials covered in the book and in lecture, followed by demonstrations of lecture materials. Cruz, Boster, & Rodriguez (1997) found that smaller groups shared information better than large groups. Conrad & Conrad (1993) found that both math majors and non-majors appeared to profit from small groups for problem solving. Four studies were found to be related to Statement 6, the examination review as a teaching practice.

Cummings (1995) used small, mixed-ability student groups to review different parts of the unit and present their findings to the class for positive results. Powers & Fowles (1998) found no significant difference between released and unreleased essay topics when 300 graduate students who wrote essays on a released topic examination and an unreleased topic examination.

Cottell (2000) described a cooperative learning structure that makes examination review a highly energized student learning experience. Bol & Hacker (2001) showed that practice tests were associated with significantly lower scores for 59 graduate students on midterm, multiple-choice items. Statement 7 and Statement 8 are both examples of Operant Conditioning.

Avoidance Learning (Negative) Reinforcement can be associated with B. F. Skinner (1969) in his book, *Contingencies of Reinforcement.* Both statements imply unfavorable consequences that lead to student avoidance behaviors. Students being required to write vocabulary by hand could take hours for them to complete; therefore, students might avoid the behavior that leads to the assignment. Students do not want to be embarrassed by the teacher grading homework in class. They might generally avoid class altogether on that day the grading takes place, if possible. Statement 9 and Statement 10 are related to Expectancy Theory mostly associated with the work of Victor H. Vroom (1964) *Work and Motivation.*

Expectancy Theory is important tool when motivating students. It specifies that motivation is the result of three types of beliefs: 1. expectancy, a belief that effort will result in performance, 2. instrumentality, the belief that performance will be rewarded and 3. valance, the person values the reward (outcome) to be received. Motivation is a multiplicative function of all three components. If any of the three is zero, then motivation is said to be necessarily zero. Statement 9 is associated with the perception that fewer chapters on an exam means, more effort on less content could lead to better performance and therefore a better outcome. Statement 10 relates to the notion that repeated, increased effort would improve performance and thereby improve the outcome. Statements 11 and 12 are reflective of a students perception of his or her ability to achieve as an individual.

Taking responsibility for in class questions directed at himself or herself and doing independent assignments reflect Internal Locus of Control. A few authors have contributed to the early understanding of Internal Locus of Control (see Szilagyi & Sims 1975; Anderson 1977; Lefcourt, Martin & Saleh, 1984). Internal Locus of Control has to do with persons who believe their outcomes stem mainly from their own actions.

The literature search revealed many studies that could be linked to the thirteen statements representative of the routine teaching practices of the three business professors. The literature provided strong evidence that many of those practices are valid for business teachers to use in their classes. Therefore, it is assumed that the related literature and the statements maintain a high degree of face validity, valid at face value.

RESULTS

Research questions were presented that this study answered. These questions were converted into null hypotheses for statistical testing. The purpose of this study was to determine if the 13 original statements associated with students' perceptions of their own learning could be reduced to a smaller number of factors without losing most of the meaning for the original combined variance. Participants surveyed were all students from eight business classes at a medium size regional university. Each of the students was asked to complete the survey. Several copies of the survey plus demographic data questions were submitted to 238 college level undergraduates. All descriptive analyses were employed using a statistical analysis software, STATA, at a medium size regional university. Initially, an exploratory factor analysis using squared multiple correlations (SMC) as prior communality estimates was used. The principal factor method using Promax (Oblique) Rotation was performed. MANOVA analyses were performed to assess significant differences among demographic variables and the three factors.

The three derived factors were used as the dependent variables to measure the predictive effect of the independent demographic variables. The null hypothesis was rejected if the F value was significant at the .05 confidence level. Rejecting the null hypothesis meant that the demographic variables significantly influenced the variance for the three factors.

DESCRIPTIVE DATA

Students were selected randomly based on their enrollment. All eight courses were either University Core or College of Business (COB) Core requirements. All COB students are required to complete *Principles of Microeconomics*, *Introduction to Business* and *Business Communication*. Each class sampled was assumed to be normally distributed and all eight courses combined were representative of the entire COB student body. Near the end of the Spring 2003 and the middle of the Fall 2003, a total of 238 surveys had been completed, providing an overall return rate of 100%. However, 20 surveys returned were not usable due to selection set bias. In Table 2, information is presented concerning usable questionnaire returns.

Table 2
Usable Questionnaire Returns

Group Type	Group Size	Usable Returns	Usable Percent
Students	238	220	99

Analysis of the demographic data revealed that 121 males and 97 females completed the survey. The average credit hours completed was 52 hours with a standard deviation of 32 hours. The declared majors of the respondents were: Accounting – 24, Management – 54, Marketing – 18, Finance – 16, MIS – 48, Double-major – 29, and Non-business major – 29. Among the respondents, there were 50 Freshmen (which comprised 23% of the respondents), 69 Sophomores (32%), 73 Juniors (33%) and 26 Seniors (12%). Table 3 presents the breakdown of

respondents across majors and class standings. Respondents were not asked to report their ethnicity.

Table 3
Descriptive Statistics by Declared Majors and Class Level Categories

Class	Accounting	Management	Marketing	Finance	MIS	Double Major	Non-Business
Senior	0	6	3	1	5	5	6
Junior	6	20	4	5	23	4	11
Sophomore	10	14	6	5	16	9	9
Freshman	8	14	5	5	4	11	3
Total	*24*	*54*	*18*	*16*	*48*	*29*	*29*

Respondents were asked to circle the most agreeable response for each of the original 13 statements. Table 4a and Table 4b provides detailed information regarding the most frequently selected responses for each of the original 13 statements as well as the means and standard deviations for each category. Statements are indicated in Table 4a and Table 4b by "S1, S2, S3, etc." For example, S2 refers to statement 2, "…instructor placed students in dyads…" (see Appendix A for a full list of statements and the survey instrument).

FACTOR ANALYSIS

Responses to the 13 item survey were subjected to an exploratory factor analysis using squared multiple correlations (SMC) as prior communality estimates. The principal factor method was used to extract the factors and was followed by a Promax (Oblique) Rotation. A Scree test suggested, as can be seen from Graph 1 below, three meaningful factors; so only three factors were retained for rotation. The rotated factor pattern is presented in Table 5. In interpreting the rotated factor pattern, an item is said to load on a given factor if the factor loading was .48 or greater for that factor (Guadagnoli & Velicer, 1988) and was less than .48 for the others. Using these criteria, four items were found to load on the first factor (S2, S3, S4, S13) which was subsequently labeled *"Cooperative Learning Dyads And Small Groups"*;

Table 4a
Students' Perceptions of Learning: Means, Standard Deviations, and Percent of Responses Indication Level of Agreement With Statement:

Statement	Mean	SD	Percent of Response					Total %
			1	2	3	4	5	
S1	3.67	1.13	5.05	8.72	28.44	29.36	28.44	100
S2	3.46	1.07	4.59	10.09	38.53	27.52	19.27	100
S3	3.70	1.06	4.13	7.34	27.98	35.32	25.23	100
S4	3.69	1.06	3.67	7.80	30.28	32.11	26.15	100
S5	3.56	1.12	5.96	8.72	32.57	28.90	23.85	100
S6	4.29	1.11	5.50	1.83	12.84	17.43	62.39	100
S7	3.26	1.19	10.09	12.39	37.16	22.02	18.35	100
S8	3.42	1.07	6.88	6.88	41.28	27.52	17.43	100
S9	4.15	1.18	5.96	4.13	14.22	20.18	55.50	100
S10	3.98	1.14	5.05	5.50	18.81	27.98	42.66	100
S11	3.43	1.23	10.09	9.17	32.11	25.23	23.39	100
S12	3.78	1.1	4.13	7.80	24.77	32.11	31.19	100
S13	3.50	1.18	7.80	9.17	33.49	24.77	24.77	100

Table 4b
Students' Perceptions of Learning: Means and Standard Deviations of Responses Indication Level of Agreement With Statement Across Majors

	ACCY		MGMT		MRKT		FIN		MIS		Double Major		Non-Business	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
S1	3.96	1.00	3.63	1.12	3.06	1.39	3.94	0.85	3.73	1.11	3.83	0.97	3.52	1.30
S2	3.21	0.98	3.57	1.11	3.33	0.97	3.50	1.21	3.81	0.98	3.62	0.98	2.83	0.93
S3	3.54	0.93	3.69	1.08	3.67	1.28	3.50	1.26	3.83	0.95	4.03	0.82	3.45	1.18
S4	3.42	1.10	3.59	1.09	3.67	1.24	3.94	1.00	3.81	0.91	4.03	0.78	3.45	1.27
S5	3.71	1.16	3.44	1.09	3.22	1.17	3.81	0.98	3.33	1.17	3.66	1.01	4.00	1.13
S6	4.42	0.97	4.28	1.17	4.33	1.33	4.50	0.73	3.79	1.24	4.48	0.99	4.72	0.80
S7	2.79	1.22	3.63	1.20	3.39	1.38	2.94	1.06	3.29	1.11	3.48	1.02	2.79	1.18
S8	3.46	1.02	3.46	1.21	3.22	1.06	3.25	1.13	3.23	0.90	3.90	0.86	3.34	1.20
S9	4.13	0.95	4.09	1.29	4.33	1.33	4.25	1.24	4.04	1.11	4.07	1.19	4.38	1.15
S10	3.79	0.98	4.07	1.15	3.67	1.19	4.19	0.83	4.27	0.98	3.97	1.30	3.55	1.33
S11	3.17	0.87	3.54	1.25	3.50	1.15	3.31	1.08	3.48	1.24	3.66	1.34	3.14	1.43
S12	3.67	1.01	3.69	1.13	3.72	1.13	3.81	0.83	3.81	1.07	4.00	1.07	3.83	1.34
S13	3.29	1.16	3.57	1.19	3.06	1.16	3.13	1.26	3.60	1.07	4.10	0.90	3.21	1.40

three items loaded on factor two (S1, S11, S12) which was labeled *"Mini Lecture and Socratic Inquiry With Independent Learning"* and two items loaded on factor three (S6, S9) which was labeled *"P-O, Expectancy Probability That Performance Will Produce Desired Outcome."* Table 6 presents the three new factors, final communality estimates and item descriptions.

Graph 1:

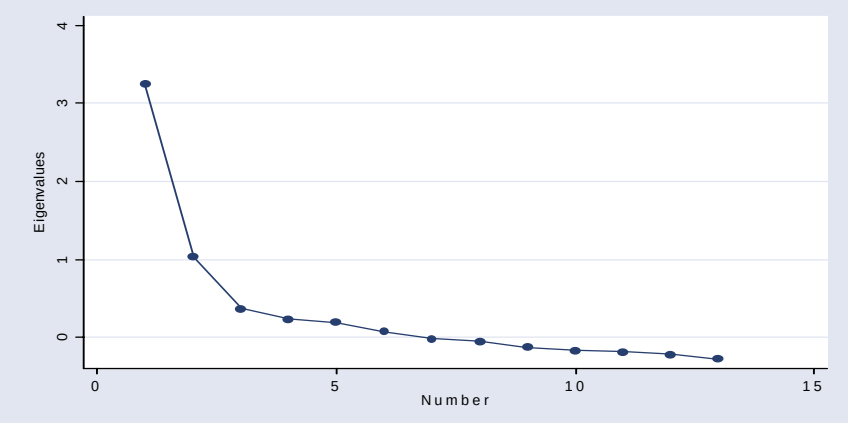

Table 5
Promax (Oblique) Rotations With Three Factors

Rotated Variable	Factor Loadings			Uniqueness
	1	2	3	
S1	-0.15	**0.48**	0.20	0.69
S2	**0.57**	0.32	-0.25	0.51
S3	**0.82**	-0.23	0.12	0.44
S4	**0.61**	0.04	0.11	0.53
S5	0.07	-0.02	0.36	0.85
S6	-0.05	-0.01	**0.72**	0.51
S7	0.21	0.26	0.03	0.81
S8	0.12	0.13	0.29	0.79
S9	0.05	0.01	**0.67**	0.51
S10	0.14	0.26	0.26	0.68
S11	0.07	**0.55**	-0.08	0.70
S12	-0.16	**0.57**	0.12	0.66
S13	**0.63**	-0.03	-0.10	0.66

Comparability between sample and population patterns could be a limitation concerning the adequacy of the sample size. The rule of thumb for an adequate sample size to conduct a

factor analysis and derive an accurate solution ranges from 2:1, depending on the author and the publication. These reported inconsistencies led to a literature review regarding sample size and

Table 6
New Factors, Item Descriptions and Final Communality Estimates

New Factor One: Cooperative Learning Dyads And Small Groups		**h^2**
S2:	I learned the subject better when the instructor placed students in dyads (two students) to practice vocabulary.	**.51**
S3:	I learned the subject better when the instructor placed students in small groups composed of three to five members to solve a case outside of class	**.44**
S4:	I learned the subject better when the instructor placed us in student-led discussion groups in class to talk about various topics.	**.53**
S13:	I learned the subject better when the instructor required a group presentation.	**.66**
New Factor Two: Mini Lecture and Socratic Inquiry With Independent Learning		**h^2**
S1:	I learned the subject better when the instructor lectured on a topic for 15 to 20 minutes.	**.69**
S11:	I learned the subject better when the instructor called on students by name to answer specific questions.	**.70**
S12:	I learned the subject better when I was given an assignment to be completed on my own.	**.66**
New Factor Three: P-O, Expectancy Probability That Performance Will Produce Desired Outcome		**h^2**
S6:	I learned the subject better when the instructor gave a "review" at least a week before an examination.	**.51**
S9:	I learned the subject better when the professor tested students over three chapters from the textbook rather than five.	**.51**

accuracy of the solution when performing factor analysis. One article was obtained which directly dealt with the relation of sample size to the stability of component patterns (Guadagnoli & Velicer, 1988). The authors stated:

> Contrary to popular rules, sample size as a function of the number of variables was not an important factor in determining stability. Component saturation and absolute sample size were the most important factors. To a lesser degree, the number of variables per component was also important, with more variables per component producing more stable results… a sample size of 150 observations should be sufficient to obtain an

> accurate solution… If components possess four or more variables with loadings above .60, the pattern may be interpreted whatever the sample size (1988: 268).

The authors used a Monte Carlo procedure to vary sample size, number of variables, number of components, and component saturation in order to examine systematically the condition under which a sample component pattern becomes stable relative to the population. The principal factor analysis, using a Promax (Oblique) Rotation, revealed high factor loadings above .60 for five of the nine factor loadings. Thus, the component pattern derived from the factor analysis was stable and the factor pattern was interpretable to the population. The sample size of 218 was considered adequate. To ascertain if there were any differences in students' perceptions among the demographic variables (grade level, college declared major and gender), results were analyzed using a two-way multivariate analysis of variance (MANOVA), with between-groups design.

HYPOTHESES TESTING

A MANOVA procedure was used to ascertain whether differences existed between three independent variables (a) college grade level, (b) declared major, and (c) gender regarding students' perceptions of teaching practices on their own learning. Pillai's trace criterion was used to determine the acceptance or rejection of the null hypotheses since Pillai's Trace is a better criterion for determining significance than Wilk's lambda when there are unequal cell sizes and the assumption of homogeneity of variance is violated. In Table 7, MANOVA results are summarized for the three null hypotheses tested with a significance level of .05. A STATA Test, Tukey's, was used for interpreting significant interactions by multiple pair-wise comparisons of demographic (independent) variables relating to the dependent (factors) variables. Research question one focused on whether a difference existed among college students

at different grade levels regarding their perceptions of teaching practices. The null hypothesis was:

Table 7
Summary of Two-Way Multivariate Analysis of Variance with Between Groups Design

Source	Pillai's Trace	DF	F Statistic	p-value
Model	0.268	30,621	2.03	0.001
College Grade Level	0.069	9,621	1.62	0.105
Declared Major	0.190	18,621	2.33	**0.001**
Gender	0.017	3,205	1.17	0.323

Ho1: There is no statistically significant difference among students at different college grade levels on measures of perception regarding teaching practices and their own learning.

This hypothesis was analyzed using a two-way MANOVA with between-groups design. The analysis revealed a marginally significant multivariate effect for the different grade levels with Pillai's Trace = 0.069, F(9,621) = 1.62 and p value = 0.105. The null hypothesis therefore could not be rejected at 5%. Table 8 represents the MANOVA results for Ho1.

Research question two focused on whether a difference existed among college students with declared majors regarding their perceptions of teaching practices. The null hypothesis was:

Ho2: There is no statistically significant difference among declared business and non-business majors on measures of perception regarding teaching practices and their own learning.

The second hypothesis was analyzed using a two-way MANOVA with between-groups design. The analysis revealed a significant multivariate effect for declared business majors with Pillai's Trace = 0.190, F(18, 621) = 2.33 and p value = 0.001. The null hypothesis therefore was rejected even at 0.01% level of significance. Table 9 represents results of Ho2 test.

Research question three focused on whether a difference existed among male vis-à-vis female students regarding their perceptions of teaching practices. The null hypothesis was:

Ho3: There is no statistically significant difference among male vis-à-vis female students regarding their perceptions of teaching practices and their own learning.

The third hypothesis was analyzed using a two-way MANOVA with between-groups design. The analysis revealed an insignificant multivariate effect for gender with Pillai's Trace = 0.017, F (3, 205) = 1.17 and p value = 0.323. The third null hypothesis therefore could not be rejected.

DISCUSSION

The analysis of data provided strong evidence that the college of business students at the medium size regional university where the 13 item teaching practices survey was administered perceived Factor 1 (*Cooperative Learning Dyads And Small Groups)* as being more closely related to their own learning than any other factor. When all factors were combined and tested for significant differences, declared major was the only independent variable among three that tested significantly at the .05 confidence level. Pillai's Trace failed to reveal significant differences for grade level and gender on all three factors.

A Tukey's multiple comparison procedure revealed significant interactions between MIS and Non-business majors .0002, Double Majors and Non-business majors .0001, and Management and Non-business majors .0012. The three business majors were significantly more favorable on all three factors than non-business majors. Table 8 illustrates those results.

Table 8
The P-Values Of Testing The Hypotheses Of No Significant Difference Between The Mean Vectors Of Each Major And The Other Majors

	Group	ACCY	MGMT	MRKT	FIN	MIS	Double Major	Non-Business
ACCY	0.6507	-----	-----	-----	-----	-----	-----	-----
MGMT	0.6289	0.4762	-----	-----	-----	-----	-----	-----
MRKT	0.8599	0.9345	0.6772	-----	-----	-----	-----	-----
FIN	0.7812	0.9171	0.7065	0.7981	-----	-----	-----	-----
MIS	0.0006	0.0164	0.1784	0.0930	0.0666	-----	-----	-----
D. Major	0.0507	0.0773	0.4713	0.2021	0.2956	0.3595	-----	-----
Non- Bus	**0.0003**	0.2114	**0.0012**	0.1811	0.1586	**0.0001**	**0.0002**	-----

In addition, when a one-way MANOVA was conducted on each factor, Factor 1 showed a significant difference on declared major and not grade level and gender. Double majors were significantly more favorable on factor 1 than Accounting major. Double majors were significantly more favorable on factor 1 than Marketing major. Double majors were significantly more favorable on factor 1 than non-business majors. The MIS major was significantly more favorable than non-business majors. The Management major was significantly more favorable than non-business majors. See Table 9a and 9b for one-way MANOVA results. Please refer to Table 10 for a display of mean differences. With all that has been found as a result of this study, what are the implications?

Now evidence has been provided that students majoring in business at the medium size regional university perceive *Cooperative Learning Dyads And Small Groups* to be closely associated with their own learning, the faculty members in the college might begin to consider integrating dyad and small group related work into their course designs. One example might be for a class that meets three days per week or 45 days per semester, maybe ten of those 45 lessons could be devoted to interactive and cooperative learning dyads and small groups. They could be tailored for both in class and outside of class activities. It is fortunate to know that business

students perceive group work to be significantly associated with their own learning because business majors need social skills.

Table 9a
Summary of One-Way Multivariate Analysis of Variance with Between Groups Design

Source	Pillai's Trace	DF	F Statistic	p-value
Model	0.075	10,207	1.68	0.09
College Grade Level	0.005	3,207	0.32	0.81
Declared Major	0.069	6,207	2.55	**0.02**
Gender	0.001	1,207	0.24	0.63

Table 9b
The p-values of testing the hypotheses of no significant difference between the mean vectors of each major and the other majors.

	Group	ACCY	MGMT	MRKT	FIN	MIS	Double Major	Non-Business
ACCY	0.26	-----	-----	-----	-----	-----	-----	-----
MGMT	0.57	0.24	-----	-----	-----	-----	-----	-----
MRKT	0.55	0.34	0.45	-----	-----	-----	-----	-----
FIN	0.85	0.60	0.67	0.81	-----	-----	-----	-----
MIS	0.08	0.07	0.40	0.18	0.31	-----	-----	-----
D. Major	**0.01**	**0.02**	0.11	**0.05**	0.11	0.41	-----	-----
Non-Bus	**0.02**	0.50	**0.04**	0.36	0.25	**0.006**	**0.001**	-----

Most organizations are designed with some degree of hierarchy of authority and goal orientation. Therefore, the business person must also be concerned with all aspects of efficiency and effectiveness. Effectiveness is an organization's ability to achieve its goals. Plans must be made to properly use resources while achieving organizational goals. Efficiency is using as few resources as possible to achieve goals. This is the reason organizations generally hire specialists and in fact, will departmentalize those specialists. What this means from the student perspective is they should learn team-work, cooperation, and collaboration with others as a necessary skill immediately transferable to employment. Students need to know how to work in groups to get things done, to achieve goals, and to prosper in their careers. Mary Parker Follett is said to have

coined the phrase, “Managers get things done through people.” The findings for this study are exciting because of the new directions for future research in practical and theoretical topics on business teaching.

Many questions were unanswered in this particular study because of its limitations and delimitations. It only set out to answer three research questions limited to a usable sample of 218 students at one institution of higher learning. These same questions must be answered by conducting a multi-university study to determine if a larger population of students would significantly agree that dyads and small group are inextricably associated with their own learning and if business majors on multiple campuses would be significantly different than non-business majors. Another study could be conducted to determine if a completely different set of teaching

Table 10
Factor Differences Across Majors

	ACCY		**MGMT**		**MRKT**		**FIN**		**MIS**		**D. Major**		**Non-Bus**	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Factor 1														
S2	3.21	0.98	3.57	1.11	3.33	0.97	3.50	1.21	3.81	0.98	3.62	0.98	2.83	0.93
S3	3.54	0.93	3.69	1.08	3.67	1.28	3.50	1.26	3.83	0.95	4.03	0.82	3.45	1.18
S4	3.42	1.10	3.59	1.09	3.67	1.24	3.94	1.00	3.81	0.91	4.03	0.78	3.45	1.27
S13	3.29	1.16	3.57	1.19	3.06	1.16	3.13	1.26	3.60	1.07	4.10	0.90	3.21	1.40
Factor 2														
S1	3.96	1.00	3.63	1.12	3.06	1.39	3.94	0.85	3.73	1.11	3.83	0.97	3.52	1.30
S11	3.17	0.87	3.54	1.25	3.50	1.15	3.31	1.08	3.48	1.24	3.66	1.34	3.14	1.43
S12	3.67	1.01	3.69	1.13	3.72	1.13	3.81	0.83	3.81	1.07	4.00	1.07	3.83	1.34
Factor 3														
S6	4.42	0.97	4.28	1.17	4.33	1.33	4.50	0.73	3.79	1.24	4.48	0.99	4.72	0.80
S9	4.13	0.95	4.09	1.29	4.33	1.33	4.25	1.24	4.04	1.11	4.07	1.19	4.38	1.15

practices could emerge as meaningful underlying constructs (factors), such as “guest speakers” and “internship experiences” as students may perceive them to be significantly related to their own learning. Hundreds of teaching practices remain untested in this manner of measuring the

perceptions of students' learning as they are related to teaching practices. Certainly dozens of studies of this type are needed. The most important study that should follow this one might be titled, "*An Analysis of Dyad and Small Group Cognitive Learning Across Business Disciplines*.

That study would be much more deeply linked to Benjamin Bloom's, *Taxonomy of Educational Objectives, Book I.* Although dyads and small groups had a high degree of significance, it could not be said to what degree of cognition those dyad and small group lessons students had in mind that could be directly linked to their own learning. This study did not set out to determine the integration of cognitive lessons with specific dyads and small groups as cognitive learning methodology. In addition, GPA might be used as a covariate in the next study to measure actual students' performance along with their perceptions.

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The Active Learning Student Survey

Credit Hours Completed: _____
I am enrolled as a: Senior ____, Junior ____, Sophomore ____, or Freshman _____
My Major is: Accounting __, Management __, Marketing __, Finance __, MIS __, or a Double Major in: _____and _____or other_____
My gender is: Male _____ or Female _____ My age is: _____
The grade I expect from this course is: A ___, B ___, C ___, D ___ or F ___.

Please circle the number that best reflects your level of agreement with the corresponding statement:
1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree

1. I learned the subject better when the instructor lectured on a topic for 15 to 20 minutes.	**1**	**2**	**3**	**4**	**5**
2. I learned the subject better when the instructor placed students in dyads (two students) to practice vocabulary.	**1**	**2**	**3**	**4**	**5**
3. I learned the subject better when the instructor placed students in small groups composed of three to five members to solve a case outside of class.	**1**	**2**	**3**	**4**	**5**
4. I learned the subject better when the instructor placed us in student-led discussion groups in class to talk about various topics.	**1**	**2**	**3**	**4**	**5**
5. I learned the subject better when the instructor used the Internet to reinforce main points.	**1**	**2**	**3**	**4**	**5**
6. I learned the subject better when the instructor gave a "review" at least a week before an examination.	**1**	**2**	**3**	**4**	**5**
7. I learned the subject better when the instructor required students to write-out all vocabulary words and definitions by hand.	**1**	**2**	**3**	**4**	**5**
8. I learned the subject better when the instructor graded homework in class.	**1**	**2**	**3**	**4**	**5**
9. I learned the subject better when the professor tested students over three chapters from the textbook rather than five.	**1**	**2**	**3**	**4**	**5**
10. I learned the subject better when the instructor gave students two or more chances to redo an assignment.	**1**	**2**	**3**	**4**	**5**
11. I learned the subject better when the instructor called on students by name to answer specific questions.	**1**	**2**	**3**	**4**	**5**
12. I learned the subject better when I was given an assignment to be completed on my own.	**1**	**2**	**3**	**4**	**5**
13. I learned the subject better when the instructor required a group presentation.	**1**	**2**	**3**	**4**	**5**