

TSBPA's business communications requirement: Has it made a difference?

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Abstract

In 2011, the Texas State Board of Public Accountancy (TSBPA) added a business communications requirement to the qualifications for candidates to sit for the CPA examination by a requirement for two credit hours in business or accounting communications, either through a discrete course, or through integration into certain accounting courses. This study was conducted to determine whether the requirement has been effective using non-equivalent groups in a modified or quasi-experimental design (Trochim, 2001). Survey data from two groups was examined: (a) a test group of accounting graduate students and master's program graduates who had completed a three credit hour course in business communications designed to meet the Board's criteria, and (b) a control group of accounting graduate students and master's program graduates who had not completed the business communications course. Questions were designed to measure attitudes and perceptions about the effect of the course on the respondents' abilities, skills, and readiness for entrance into the accounting profession. Results were measured by testing hypotheses of no difference in the proportions between the test group and the control group over various questions about the outcomes desired by TSBPA. Results indicate students who have taken the course believe they are better prepared, in three major learning outcome areas, than students who have not had the course, validating the TSBPA requirement insofar as students' attitudes about their own abilities.

Key Words: accounting communication, business communication

Introduction

On July 1, 2011, the Texas State Board of Public Accountancy (TSBPA) added a business communications requirement to the qualifications for candidates to sit for the CPA examination. By modifying Board Rule 511.58, defining the courses that may be counted toward the extant requirement for 24 credit hours in Board approved business courses, TSBPA added a requirement for two credit hours in business or accounting communications, either through a discrete course, or through integration into certain accounting courses. This study examined whether the requirement has been effective in meeting the goals of TSBPA. The study was conducted using non-equivalent groups in a modified or quasi-experimental design (Trochim, 2001), by examining survey data from two groups: (a) a test group of accounting graduate students and master's program graduates who had completed a three credit hour course in business communications designed to meet the Board's criteria, and (b) a control group of accounting graduate students and master's program graduates who had not completed the business communications course. Survey questions were designed to elicit responses concerning attitudes and perceptions about the effect of the course on the respondents' abilities, skills, and readiness for entrance into the accounting profession, with 4-point modified Likert scales. The results were measured by testing hypotheses of no difference in the proportions between the test group and the control group over various questions about the outcomes desired by TSBPA. Results indicated students who have taken the course believe they are better prepared, in three major learning outcome areas, than students who have not had the course, validating the TSBPA requirement insofar as students' attitudes about their own abilities.

In a phenomenon similar to the idea of standards overload, it is possible for state boards of public accountancy to engage in qualifications overload. For this study, qualifications overload was defined as requiring qualifications in excess of those needed to provide reasonable assurance that persons allowed to sit for the CPA exam were capable and competent to do so. The July 1, 2011 amendment to the Texas educational requirements for the CPA examination, TSBPA Rule 511.58, mandated a 2-credit hour study in accounting or business communications may have fallen into the qualifications overload category. The research reported in this paper was intended to provide information about the effect of a business communications course on accounting students at the graduate level to establish a benchmark that may be useful in evaluating and measuring whether the accounting or business communications requirement promulgated by TSBPA has been effective as part of qualifications requirements intended to provide TSBPA with reasonable assurance that people allowed to sit for the CPA exam are appropriately prepared to do so.

Review of the Literature

Faculty at institutions of higher learning who teach accounting in Texas have not been shy about questioning the TSBPA's growing list of qualifications to sit for the CPA examination. Vanzante (1993) recapped the pros and cons of the 1988 adoption of rules that changed Texas to the 150 hour requirement. The change to 150 hours, from 120, was decried by small college faculty without graduate programs, and was characterized as being instituted by the big state schools which would forever control and dictate the requirements better to enhance enrollment in their graduate accounting programs. According to Vanzante, the Texas Higher Education Coordinating Board, which controls the degrees offered by state colleges and universities, said

they would not automatically approve new graduate degrees in accounting that were proposed, if they were proposed for no reason other than to allow students to meet the 150-hour requirement. The American Accounting Association (AAA) eventually produced the report *Accounting Education: Charting the Course through a Perilous Future* (Albrecht & Sack, 2000). An overall assessment of the state of accounting education at the time of its writing, the Albrecht and Sack report guided the profession and the accounting academy in the adoption and implementation of substantive changes the accounting curriculum.

TSBPA, in 2005 again changed educational requirements for those wishing to sit for the CPA exam, instituting a requirement for a three credit hour course in business and accounting ethics. In a comprehensive review of the history of the debate over specific ethics requirements pros and cons, Hurtt and Thomas (2008) traced the Texas implementation experience for the ethics course in detail, but left the efficacy of the courses in meeting TSBPA's goals to later research. Overall, they later found that CPAs in Texas held a positive view of the ethics requirement, though without enthusiasm for the biennial update, and that the reported decline in ethics violations in the state argued for the efficacy of the requirement (K. Hurtt & Thomas, 2011).

Other reporters argued that the ethics rule itself was flawed and inconsistent, although detailed in content requirements (Vanzante & Ketcham, 2005). They also suggested the application of the rules, via TSBPA's process and outcomes for approval of the course syllabi from the various colleges and universities, were inconsistent. This apparent lack of clarity, as described by Vanzante and Ketcham, increased the difficulty of meeting TSBPA's requirement. By inference, this led to the question of whether the objectives for the business and accounting communication rules lack sufficient clarity to allow an empirical study of the outcomes of such a course to make a conclusion about the efficacy of the courses.

The question of the value of business communications in the business curriculum was discussed by several researchers, at the least in accounting and marketing, and in light of the old AACSB requirement for a core experience in business communication, if not across all business disciplines (Marcal, Hennessey, Curren, & Roberts, 2005; Swanson, Meinert, & Swanson, 1994; Vanzante & Ketcham, 2005). The relevance of communications courses, defined as the extent to which curriculum content reflects what practitioners think should be taught, has also been discussed (Maupin, 1993), and considerable disparity between what was wanted by practitioners and what was being taught was reported. A recent survey of partners in big accounting firms indicated that communication skills were rated second only to technical ability in promotions to senior auditor and to audit manager, and for promotion to audit partner, communication skills were rated the most important among six skill sets (Blanthorne, Bhamornsiri, & Guinn, 2005). Outside the accounting discipline other researchers have reported a core course in business communications within the business administration curriculum may be the most important of all core business courses (Swanson, et al., 1994). Students, however, continue to underestimate the value of written and oral communication skills (Ameen, Bruns, & Jackson, 2010). Not surprisingly, students today rate grades and low workload more important than assignments designed to develop their analytical/computational skills, and more important than assignments designed to develop communication skills (Milliron, 2008).

Measurements of course/program effectiveness depend, in part, on the precision of the assessor's understanding of the objectives of the course or program, and clear explicit goals for student learning outcomes or program outcomes (Apostolou, 1999). This position seems obvious, and is reflected by outcomes assessments authorities such as the Southern Association of

Colleges and Schools (Carter, Anson, & Miller, 2003; SACS, 2012). Dr. James Flagg, Chairman of TSBPA's Qualifications subcommittee at the time the communications rule was adopted (personal communication, November 12, 2012), reported that the need for the communications requirement was based on (a) the American Institute of Certified Public Accountants' (AICPA) 2008 Practice Analysis of the Profession, (b) the Board of Examiners' 2008 exposure draft outlining the proposed Content and Skill Specifications for the CPA examination, and (c) the National Association of State Boards of Accountancy's model rules (NASBA, 2011) at subsections (a)(1) and (d)(5) of Article 5, Rule 5-2, that call for the two hour communications education requirement. One of the purposes of the Content and Skill Specification document is to apprise faculty as to the knowledge and skills students will need to pass the CPA exam. The Content and Skill Specification for 2008 was based on the technical report of the 2008 Practice Analysis. The Practice Analysis surveys, conducted periodically by AICPA, are intended, *inter alia*, to provide information that can be used to enumerate and measure the skills and knowledge to perform the tasks that will be required of people entering the accounting profession. Based on the information developed in the 2008 iteration of the Practice Analysis, the Content and Skill Specification document was rewritten, among other things, to organize the information into categories including (a) knowledge and understanding, (b) application of knowledge, and (c) communication.

Research Design

Methodology and Data Collection

This research involved a quantitative methodology and a survey technique to gather a broad range of attitudinal and demographic data. Survey participants consisted of two groups: a test grouping of students/graduates who had completed a TSBPA approved course in business communications and a control group of students/graduates who had not taken the course. Both groups were drawn from a population comprised of the student body and alumni of a graduate program in accounting at a private university in Texas.

The surveys were conducted electronically via the web-based survey tool SurveyMonkey and included 4-point Likert scaled answers to questions about the efficacy of the communications courses, as measured by respondents' attitudes about their business and accounting communications effectiveness (*Very Well, Well, Not Well, Not at all Well*). The modified 4-point Likert-type scale was used without the central neutral category to improve the discriminative ability of the survey instrument, as recommended by Robinson and Shepard (2011). Demographic questions included eligibility for CPA exam, gender, age, marital status, ethnicity, MS-Accounting degree completion date, communications course completion date, employment status, student status, and years of employment experience in accounting.

Survey participants were recruited by email beginning April 15, 2013 and ending May 31, 2013 and included a follow-up reminder to consider participating in the survey. The survey invitation was sent to 378 participants in the test group; 40 were returned with invalid addresses, and 53 responded. It was also sent to 28 participants in the control group; 23 responded. Table 1 presents the response rates for both the test and control groups.

Data Analysis

Aggregate scores for test group and control group survey participants were compared by computing t to test the null hypothesis of no difference in the means of the aggregate Likert-

weighted scores across all questions between the two groups. For each of the test group and the control group, the sample sizes (n) were defined as the sum of number of responses to each of the 28 questions in the survey. For the aggregate analysis, these sizes computed to 1,435 for the test group and 639 for the control group. Both were slightly less than the number of participants in each group, 52 for the test group and 23 for the control group, times the 28 questions, as some participants in both groups did not answer all of the questions.

H₁: The mean score of attitudes about the effect of a course in business communications on abilities, skills, and readiness for entrance into the accounting profession of those who completed a graduate business communications course *is the same* as those who have not completed a graduate business communications course.

H₂: The mean score of attitudes about the effect of a course in business communications on abilities, skills, and readiness for entrance into the accounting profession of those who completed a graduate business communications course *is not the same* as those who have not completed a graduate business communications course.

The matrix of questions (Table 2) used in the t test computation included:

- (a) a group of questions designed to address responders' attitudes about their abilities to communicate complex ideas in writing ($n_{Test\ Group} = 564, n_{Control\ Group} = 253$);
- (b) a group of questions designed to address responders' attitudes about their abilities to leverage business standard word processing software, spreadsheet software, and social media ($n_{Test\ Group} = 259, n_{Control\ Group} = 115$); and
- (c) a group of questions designed to address responders' attitudes about their abilities surrounding the AICPA's competency standards (2005) in technical content and writing skills ($n_{Test\ Group} = 718, n_{Control\ Group} = 271$).

The data were also analyzed by computing z scores for the difference in sample proportions between the test group and control group samples taken as wholes. The proportions were calculated without the Likert-weighting by counting the number of responses to each question in each of the four possible answer categories, and computing the proportion of the total answers represented by the counts in each of *very well prepared*, *well prepared*, *not well prepared*, and *not at all well prepared*, for the test group and for the control group. The data were also analyzed by computing z scores for the difference in sample proportions between the test group and control group across a matrix of:

H₁: The mean score of attitudes about the effect of a course in business communications on abilities, skills, and readiness for entrance into the accounting profession of those who completed a graduate business communications course *is less than* as those who have not completed a graduate business communications course.

H₂: The mean score of attitudes about the effect of a course in business communications on abilities, skills, and readiness for entrance into the accounting profession of those who completed a graduate business communications course *are greater than or equal to* those who have not completed a graduate business communications course.

The same matrix of questions (Table 2) was used in the z test computation.

Results

Demographics

The demographic characteristics of the participants in the test group and the control group are shown in Tables 3 through 11. Table 3 reveals that the highest percentage of respondents were either not yet eligible to take the CPA exam, or were eligible and have not yet scheduled to take it.

Table 4 demonstrates that more females than males completed the survey, the highest percentage of respondents were age 20-29 or 30-39, more than 50% were Hispanic, and most were single. The majority of survey respondents completed their bachelor degree between 2009 and 2012, which is consistent with the enactment of the business communication course requirement by the TBSPA in 2009 (Table 5). Table 6 shows completion of MS-Accounting degrees falls largely in the period Fall 2010 through Fall 2012. Table 7 shows the % of respondents who completed the business communications course since its inception in Spring 2009.

Students in both the test and control groups were mostly full-time status (Table 8), in the control group more were employed full-time than in the control group (Table 9), and those employed in accounting predominantly had less than 5 years of experience (Table 10). Of those employed in accounting, more respondents in both groups were employed in industry as accountants than in public or government accounting (Table 11).

Inferential Statistics

For the t -test of the null hypothesis of no difference in the means of the Likert-weighted aggregate responses between the test group and control group samples, computed t was 16.692, df 1,059, and the p -value at the 1% level of significance was 1.047E-55, or essentially zero. For the control group, n was 639, the mean was 2.704, and the standard deviation was 0.861. For the test group, n was 1,435, the mean was 3.357, and the standard deviation was 0.726. The variances of the two samples were not equal, suggesting at least one non-Gaussian distribution, so the alternative calculation of degrees of freedom suggested by Aczel and Sounderpandian (2006) was used. The null hypothesis was rejected. See Table 12.

The results of calculations for the tests of the null hypotheses of the equality of the means, across the matrix of questions set out in Table 2. All three null hypotheses were rejected at the 1% level of significance. Means, *sample sizes*, standard deviations, test statistics t , and the related degrees of freedom are shown in Table 13.

Computed statistics z for the remaining null hypotheses of no difference in the proportions of various answers for groups of questions, across the test group and the control group, are shown in Table 5. In all cases, the null hypotheses were rejected at the 1% level of significance. The number of successes and the proportion for each group of questions, across the control group and the test group, the pooled proportion for each, and the z test statistics are shown in Table 14. As indicated in the discussion of demographics of the control group and the

test group, the number of survey participants in the control group was 25, and the number of survey participants in the test group was 53. The sample sizes in the statistical tests are the sums of the number of participants answering each of the 28 questions in each of the test group and the control group.

Conclusion

Taken as a whole, and viewed in the three major groups of questions, the results indicate that among the students sampled, those who have completed the business communications course believe they are better prepared to (a) communicate complex ideas in writing, (b) leverage business standard word processing software, spreadsheet software, and social media, and (c) demonstrate their abilities surrounding the AICPA's competency standard (2005) in technical content and writing skills. This conclusion is supported by the *t*-tests of the differences in means between the test group and the control group using Likert-weighted surveys, and is supported by the *z*-tests of the differences in the non-weighted proportions indicating feelings of being well prepared or very well prepared, or both taken together, across the test group and the control group. The statistical tests of the null hypotheses of the equality of the means of these groups, or of the differences in the proportions between the two groups, were robust, rejecting the null hypotheses of the equality of means or of the differences in proportions at the 1% level of significance, with large sample sizes and small *p*-values.

The evidence of the study was that there were significant differences in the attitudes of the survey respondents, comparing the test group who had taken the communications class to the control group who had not taken the class, with regard to their attitudes about a wide array of questions about their ability to communicate successfully. Overall, and question by question, the test group felt better prepared than the control group.

Limitations and Recommendations

The tests in this study did not establish the reasons for the differences in attitudes between the two groups, but it was thought reasonable to assume the business communications course was a causative factor. The tests did not speak to the level or quality of communication skills of the participants of either the test group or the control group. No conclusion can be drawn as to the adequacy of the course relative to the objectives of the TSBPA in establishing their communications educational requirement, but other evidence outside the scope of this study (content of the course, TSBPA's communications content approval rubric, student performance in the course, etc.) may speak to this issue. The design of the study, and its results, may not support the objectives of the study as intended. The study was based on a single iteration survey of the control group whose members had not taken the communications class, and a single iteration survey of the test group, self-selected from the population of all students who had taken the communications class, where the class was one course at one university. Accordingly, it is possible that the results may not generalize well with the overall population of interest to the TSBPA, or any other state board of accountancy. The target survey candidates were invited to participate in the survey by email, and the survey was conducted with web-based methodology. Thus, there may have been self-selection by students who enjoyed the course, which may have biased the results regardless of the actual level of improvement or change in communications abilities. Finally, this study makes no measure of the effect size. Likert scaled measures indicate

relative degrees of like over dislike, approve over disapprove, and so on, but they do not speak to absolute differences. Hence, test group participants may universally express happiness with their abilities, and control group participants may express lesser degrees of happiness with their particular abilities, but neither group speaks to the absolute or objective level of their abilities. In other words, in a study of this type, one can know how the participants feel about their abilities, but have no knowledge of their actual abilities.

Possibilities for further study may include future iterations of the study as more students take the course over time. This could increase the sample sizes and confirm or refute the results obtained in this iteration, enhancing internal reliability. External reliability may be enhanced by other researchers at other institutions repeating the study with different sets of courses, instructors, students, and outcomes.

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Appendix

Table 1
Response Rates

	Test Group	Control Group
Invited	378	28
Returned Nondeliverable	40	0
Delivered	338	28
Responded	53	23
Response Rate (Delivered/Responded)	16%	82%
Nonresponse	285	5

Table 2
Categorization of questions & responses, for the differences in proportions tests

Category	How well do you feel you are prepared...	Response Category
1	Overall?	Very Well/Well
2	Overall?	Very Well
3	Overall?	Not well/Not at all well
4	To communicate complex ideas in writing?	Very Well/Well
5	To communicate complex ideas in writing?	Very Well
6	To communicate complex ideas in writing?	Not well/Not at all well
7	To leverage business standard word processing, spreadsheet, and social media?	Very Well/Well
8	To leverage business standard word processing, spreadsheet, and social media?	Very Well
9	To leverage business standard word processing, spreadsheet, and social media?	Not well/Not at all well
10	To demonstrate the AICPA competency in technical content & writing skills?	Very Well/Well
11	To demonstrate the AICPA competency in technical content & writing skills?	Very Well
12	To demonstrate the AICPA competency in technical content & writing skills	Not well/Not at all well

Table 3
Eligibility to take the CPA Exam (respondents could select multiple items)

Eligibility Statement	Test Group	Control Group
I am not yet eligible to take the CPA Exam	12 (19%)	17 (59%)
I am eligible to take the CPA exam, but I am not yet scheduled to take it.	30 (47%)	
I have successfully completed the Business Environment and Concepts section of the CPA exam.	1 (2%)	1 (3%)
I have successfully completed the Auditing and Attestation section of the CPA exam.	2 (3%)	1 (3%)
I have successfully completed the Regulation section of the CPA exam.	1 (2%)	1 (3%)
I have successfully completed the Financial Accounting and Reporting section of the CPA exam.	4 (6%)	2 (7%)
I do not plan to take the CPA exam	6 (9%)	8 (28%)
I am scheduled to take at least one part of the CPA exam.	5 (8%)	
Nonrespondents	3 (5%)	

Table 4
Gender, Age, Ethnicity & Marital Status ($n_{Test\ Group} = 48, n_{Control\ Group} = 25$)

	Test Group <i>n</i>	Test Group %	Control Group <i>n</i>	Control Group %	Total <i>n</i>	Total %
Gender						

Male	17	35%	13	52%	30	41%
Female	31	65%	12	48%	43	59%
Total	48		25		73	
Age						
20-29	32	67%	20	80%	52	71%
30-39	12	25%	4	16%	16	22%
40-49	2	4%	1	4%	3	4%
50+	2	4%	0		2	3%
Total	48		25		73	
Ethnicity						
White, Non-Hispanic	13	27%	4	16%	17	23%
Hispanic	25	52%	14	56%	39	53%
Black, Non-Hispanic	3	6%	0		3	4%
Asian	4	8%	4	16%	8	11%
Pacific Islander	0		1	4%	1	1%
Other	3	6%	2	8%	5	7%
Total	48		25		73	
Marital Status						
Single	28	58%	17	68%	45	62%
Married	17	36%	6	24%	23	32%
Significant Other	1	2%	1	4%	2	3%
Divorced	2	4%	1	4%	3	4%
Total	48		25		73	

Table 5

Bachelor Degree Completion Year ($n_{\text{Test Group}} = 43$, $n_{\text{Control Group}} = 15$)

	Test Group <i>n</i>	Test Group %	Control Group <i>n</i>	Control Group %	Total <i>n</i>	Total %
2004	1	2%	0		1	2%
2005	3	7%	0		3	5%
2006	1	2%	0		1	2%
2007	6	14%	1	7%	7	12%
2008	3	7%	4	27%	7	12%
2009	5	12%	1	7%	6	10%
2010	7	16%	1	7%	8	14%
2011	10	23%	4	27%	14	24%
2012	7	16%	4	27%	11	19%
Total	43		15		58	

Table 6

MS-Accounting Degree Completion Semester/Year ($n_{\text{Test Group}} = 36$, $n_{\text{Control Group}} = 3$)

	Test Group <i>n</i>	Test Group %	Control Group <i>n</i>	Control Group %	Total <i>n</i>	Total %
Fall 2008	0		1	33%	1	3%
Spring 2009	1	3%	0		1	3%
Fall 2009	1	3%	0		1	3%
Fall 2010	6	17%	0		6	15%
Spring 2011	8	22%	0		8	21%
Fall 2011	3	8%	0		3	8%
Spring 2012	5	14%	1	33%	6	15%
Summer 2012	1	3%	0		1	3%
Fall 2012	11	31%	1	33%	12	30%

Total	36	3	39
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Table 7

Business Communications Course Completion Semester/Year ($n_{\text{Test Group}} = 41$, $n_{\text{Control Group}} = 0$)

	Test Group n	Test Group %	Control Group n	Control Group %	Total n	Total %
Spring 2009	1	2%	0		1	2%
Fall 2009	3	7%	0		3	7%
Spring 2010	2	5%	0		2	5%
Fall 2010	4	10%	0		4	10%
Spring 2011	4	10%	0		4	10%
Fall 2011	7	17%	0		7	17%
Spring 2012	9	22%	0		9	22%
Fall 2012	11	27%	0		11	27%
Total	41		0		41	

Table 8

Student Status ($n_{\text{Test Group}} = 56$, $n_{\text{Control Group}} = 24$)

	Test Group n	Test Group %	Control Group n	Control Group %	Total n	Total %
Full-time	50	89%	19	79%	69	86%
Part-time	6	11%	5	21%	11	14%
Total	56		24		80	

Table 9

Employment Status ($n_{\text{Test Group}} = 51$, $n_{\text{Control Group}} = 25$)

	Test Group n	Test Group %	Control Group n	Control Group %	Total n	Total %
Full-time	37	73%	9	36%	46	61%
Part-time	4	8%	4	16%	8	11%
Not Employed	10	20%	12	48%	22	29%
Total	51		25		76	

Table 10

Years Employed in Accounting ($n_{\text{Test Group}} = 43$, $n_{\text{Control Group}} = 19$)

	Test Group n	Test Group %	Control Group n	Control Group %	Total n	Total %
Less than 1	4	9%	0		4	6%
1-4 Years	22	51%	4	21%	26	42%
5-9 Years	6	14%	1	5%	7	11%
10+ Years	5	12%	1	5%	6	10%
Not Employed in Accounting	6	14%	13	68%	19	31%
Total	43		19		62	

Table 11

Accounting Employment Sector ($n_{\text{Test Group}} = 48$, $n_{\text{Control Group}} = 20$)

	Test Group n	Test Group %	Control Group n	Control Group %	Total n	Total %
Public Accounting	8	17%	1	5%	9	13%
Industry Accounting	23	48%	4	20%	27	40%

Government Accounting	4	8%	1	5%	5	7%
Not Employed in Accounting	13	27%	14	70%	27	40%
Total	48		20		68	

Table 12
t-test for difference in means—Likert-weighted aggregate

Question grouping		Test group	Control group	Result
Aggregate	Size	1,435	639	<i>n</i>
	Mean	3.357	2.704	<i>x-bar</i>
	Std. Deviation	0.727	0.861	<i>s</i>
	Test Statistic	16.692		<i>t</i>
	df	1,059		
	p-value	1.047E-55		Reject

Table 13
t-test for difference in means—Likert-weighted question groups

Question grouping		Test group	Control group	Result
(a)	Size	564	253	<i>n</i>
	Mean	40.750	14.061	<i>x-bar</i>
	Std. Deviation	37.927	9.450	<i>s</i>
	Test Statistic	15.663		<i>t</i>
	df	699		
	p-value	12.81E-47		Reject
(b)	Size	259	115	<i>n</i>
	Mean	46.530	14.267	<i>x-bar</i>
	Std. Deviation	53.828	10.872	<i>s</i>
	Test Statistic	9.180		<i>t</i>
	df	301		
	p-value	7.152E-18		Reject
(c)	Size	718	271	<i>n</i>
	Mean	43.688	15.833	<i>x-bar</i>
	Std. Deviation	45.546	14.232	<i>s</i>
	Test Statistic	14.606		<i>t</i>
	df	964		
	p-value	8.47E-44		Reject

Table 14
Tests of proportions through groupings of questions across control test groups

Question Grouping	Control group		Test group		Pooled	<i>z</i>	Result at 1% significance
	Successes	Proportion	Successes	Proportion			
1	380	0.595	552	0.385	0.449	-8.873	Reject

