



Efficacy of TILT Study Groups AY 2014-2015

The Institute for Learning and Teaching (TILT) provided academic support via the study group program to 282 unique students (296 cases of students participating in study group for distinctive courses) for seventeen lower-level undergraduate courses in the 2014-15 academic year.¹ To quantify the efficacy of the study group program, the current analysis compares the course grades of study group program participants to non-participants enrolled in the same courses. Additionally, a regression analysis was completed to assess whether course grades could be predicted by program participation after controlling for academic preparation (CCHE Index). Please contact Institutional Research, Planning, & Effectiveness should you have any questions or comments regarding this analysis.

Results Overview: Overall, study group participants had a higher course grade than non-study group participants. There were no significant differences between average CCHE index scores. When the CCHE index was controlled for, thereby isolating the impact study group participation has on course grade, students who participated in study groups had overall higher course grade when compared to those who did not participate. There was no evidence that frequent study group visits impacted a student's course grade compared to students who did not attend study group as frequently; however, the minimum requirement of three visits to be included in the study and the small sample size makes identifying significant effect sizes difficult.

Interpreting the Results: Please note the small group sizes for most individual courses make it difficult to extrapolate significant results and should be used with caution. Analyses conducted in aggregate will be more accurate than those analyses conducted at the individual course level. A small p-value indicates the results are less likely due to chance. Results yielding a p-value of .05 are considered statistically significant. Stated otherwise, smaller p-values indicate more significant results. Course grade and grade points can be interpreted as follows: A = 4.0, B = 3.0, C = 2.0, D = 1.0, F = 0. Students with course grades of I or W were excluded from all grade point analyses (4 study group participants and 549 non-study group participants).

¹ There were 306 cases initially reported. Ten cases were excluded after their study group course did not match a registered course for that term (n = 296).



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1. Research Question: Do students who participate in the TILT study group programs earn higher course grades than those students who do not participate?

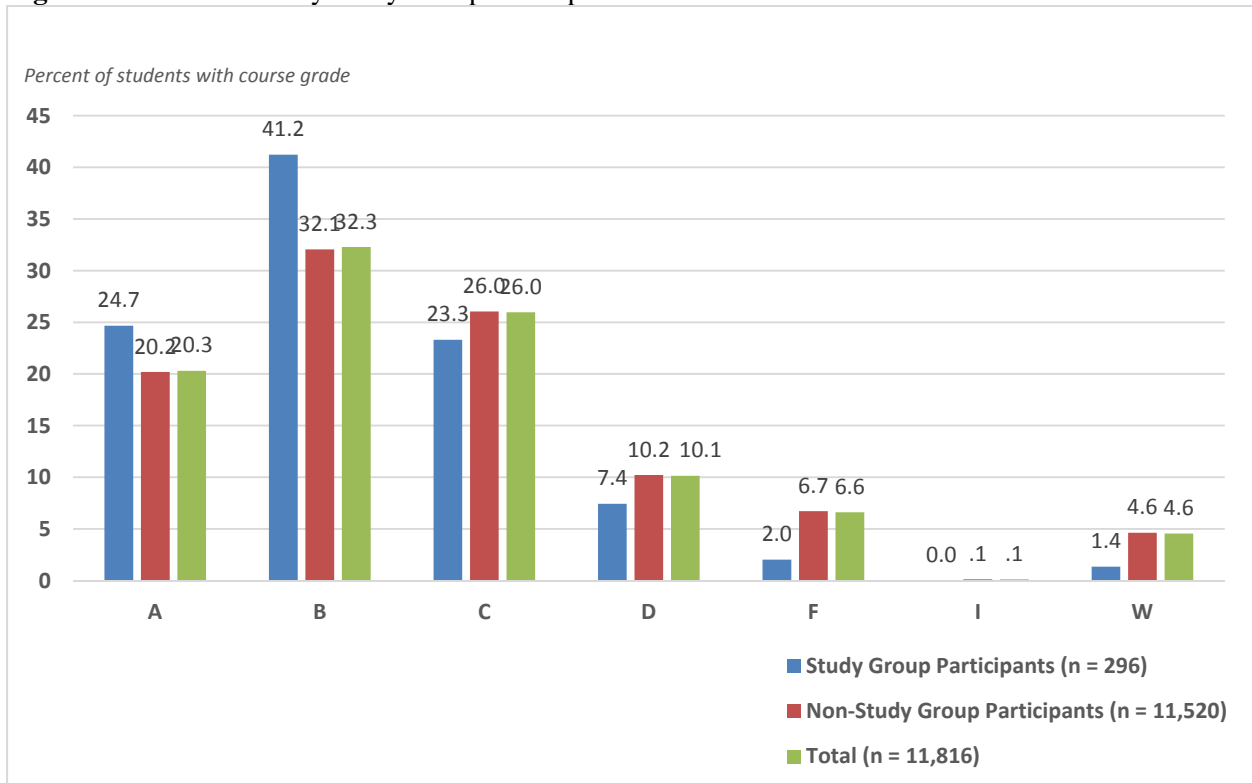
Looking at all courses that offered study groups for the 2014-2015 academic year, students who participated in study groups received significantly higher course grades on average (mean = 2.83) when compared to non-study group participants (mean = 2.53) ($d = .31$). There was no overall significant difference in index scores between study group and non-study group participants. Examining individual courses, study group participants had significantly higher average grades in CHEM 111, CHEM 341, and MATH 155. Students who participated in CHEM 111 study groups had significantly higher CCHE index scores on average than non-study group participants in CHEM 111; however, students who participated in LIFE 212 study groups had lower CCHE index scores on average than non-study-group participants in LIFE 212 (see Table 1).

Interpreting the Results (Table 1): For a statistically significant result ($p < .05$), an effect size, reported as Cohen's d , is included. An effect size is a standardized measure that describes the magnitude of the difference between the two group means. This allows for a practical interpretation for understanding to what extent the two groups differ. Although there is no objective rule, Cohen (1988) suggests the following guide for interpreting an effect size: small = .20, moderate = .50, large = .80.



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Figure 1. Course Grade by Study Group Participation²



² Course grades were collapsed into whole grades for summary purposes. For example, course grades of B+ and B- were categorized as 'B'.



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Table 1. Academic Year 2014-15: Average course grade and CCHE index across study group program participant status and course.

Course	Study Group Participants			Non-Study Group Participants			d
	#	Average Course Grade	Average CCHE Index	#	Average Course Grade	Average CCHE Index	
ART 100*	6	3.00	111.67	624	3.07	110.78	
BC 351*	7	2.95	127.00	403	2.59	121.43	
BZ 101*	9	2.56	112.33	182	2.13	111.59	
CHEM111	10	3.23	127.88	1,788	2.20	117.93	1.20 .98
CHEM113	18	2.59	118.71	1,243	2.29	119.17	
CHEM341	37	2.95	124.26	558	2.28	121.25	0.62
CIVE260	61	2.52	121.77	341	2.50	123.55	
ECON202	17	2.41	111.93	1,835	2.66	113.99	
ECON204*	7	2.71	109.17	576	2.53	112.40	
FSHN350	26	3.17	113.39	204	2.95	117.43	
FSHN470**	47	2.98	115.53	20	2.73	120.64	
LIFE103**	7	2.71	116.50	434	2.42	118.35	
LIFE201B**	5	2.53	115.75	167	2.59	124.04	
LIFE212*	6	3.89	103.50	148	3.55	126.31	1.68
MATH141	14	2.86	108.17	1,164	2.38	110.29	
MATH155**	3	3.89	121.00	300	2.35	115.96	1.68
STAT301	12	2.70	115.90	984	2.92	116.84	
Total	292	2.83	117.79	10,971	2.53	116.35	.31

Note: Significant mean course differences ($p < .05$) between study group participants and non-study group participants for average course grade and average CCHE index are highlighted in orange and green cells (respectively).

*= Fall 2014 semester only; ** = Spring 2015 semester only



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2. Research Question: Does participation in the TILT study group program predict a higher course grade after controlling for academic preparation (CCHE Index)?

- Overall, participation in the study group program significantly predicted a higher course grade when compared to those students who did not participate in the study group program when looking above and beyond the impact of index (average of a .28 grade point increase).
- Students who were in a study group for Chemistry, Life, and Math courses (categorized in aggregate due to the small sample sizes) had significantly ($p < .05$) higher course grades (average increase of .49, .79, and .87 grade points respectively) compared to those students in the same courses who did not participate in a study group. At the individual course level, study group participation for CHEM 111, CHEM 341, LIFE 212, and MATH 141 courses predicted significantly higher course grades after controlling for index (see Table 2).

Interpreting the Results (Table 2 and 3):

- Course level analyses are limited due to the small number of study group participants. Please interpret results with extreme caution and note the small sample sizes may not yield significant results even if there may be an effect. Courses were combined when possible over both terms and/or when within the same departments (e.g. three chemistry courses were combined and reported in aggregate in addition to reported individually).
- The beta coefficient, B , represents the association between course grade and study group participation after controlling for CCHE index. For instance, a coefficient of .50 would indicate study group participation results in an average increase of .50 points in their final course grade after controlling for a student's index.
- R-squared is a statistical measure used to explain the percentage of the variation in course grades described by the two variables included in the model: study group participation and index. An R-squared of 0% indicates the two variables in the model explain none of the variability in the response data around the mean, while 100% indicates the model explains all of the variability of the respondent data around the mean. Thus, the higher the R-squared, the better job study group participation and index do at explaining course grade. For these results, R-squared is relatively low for all models. This indicates there are likely other predictors besides index and study group program participation explaining one's course grade. This is not an unexpected finding since a multitude of student characteristics and college experiences play a role in student grade performance.
- A bolded p value indicates study group participation is a statistically significant predictor of course grade above and beyond index level at the $p < .05$ level.



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Table 2. Linear regression results: Predicting final grade points based on study group program participation after controlling for CCHE index.

Course	# Study group Participants	# Non-study group Participants	R ²	B	p
ART 100*	6	624	0.13	0.09	0.85
BC 351*	7	403	0.07	0.14	0.76
BZ 101*	9	182	0.44	0.44	0.17
CHEM	65	3,589	0.20	0.49	0.00
CHEM111	10	1,788	0.24	0.72	0.03
CHEM113	18	1,243	0.19	0.34	0.12
CHEM341	37	558	0.12	0.55	0.01
CIVE260	61	341	0.11	0.03	0.85
ECON	24	2,411	0.16	0.02	0.94
ECON202	17	1,835	0.16	-0.11	0.65
ECON204*	7	576	0.16	0.33	0.35
FSHN	73	224	0.09	0.08	0.57
FSHN350	26	204	0.11	0.20	0.35
FSHN470**	47	20	0.07	0.28	0.33
LIFE	18	749	0.24	0.79	0.00
LIFE103**	7	434	0.20	0.25	0.56
LIFE201B**	5	167	0.28	0.81	0.11
LIFE212*	6	148	0.15	0.99	0.00
MATH	17	1,464	0.11	0.87	0.01
MATH141	14	1,164	0.09	0.77	0.03
MATH155**	3	300	0.17	1.20	0.07
STAT301	12	984	0.14	0.05	0.87
Total	292	10,971	0.13	0.28	0.00

Note: The small sample sizes make the discovery of a significant effect difficult. Please interpret results with extreme caution and note the small sample sizes contribute to lack of significant results.

**= Fall 2014 semester only; ** = Spring 2015 semester only*



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3. Research Question: Does participation frequency in the TILT study group program predict a higher course grade after controlling for academic preparation (CCHE Index)?

For the 2014-2015 academic year, the number of visits to a course's study group did not significantly impact course grade after controlling for a student's CCHE Index among study group participants. On average for the academic year, a student visited the course's study group 6.10 times.

FSHN 470 had the most frequent study group participation (47 students) with the average participant attending a course's study group 9.09 times (see Table 3). Study group participants for BZ 101, CIVE 260, and MATH 141 visited a course's study group more than 6 times on average.

Table 3. AY 2014-2015: Linear regression results: Predicting final grades of study group participants based on number of study group visits after controlling for CCHE index.

Course	# Study Group Participants	Average Grade Points	Avg. Grade Points Std. Dev.	Avg. # of Visits	Avg # of Visits: Std. Deviation	Min # Visits	Max # Visits	R ²	B	p
ART 100*	6	3.00	0.63	5.67	3.72	3	13			
BC 351*	7	2.95	1.01	4.71	2.87	3	11			
BZ 101*	9	2.56	0.82	7.33	6.32	3	20			
CHEM	65	2.89	0.86	5.56	2.61	3	13	0.21	-0.06	0.14
CHEM111	10	3.23	0.63	5.70	1.57	3	8	0.50	-0.07	0.64
CHEM113	18	2.59	1.00	4.67	1.68	3	8	0.26	-0.19	0.22
CHEM341	37	2.95	0.81	5.95	3.08	3	14	0.13	-0.05	0.30
CIVE260	61	2.52	0.89	6.52	3.12	3	15	0.13	0.01	0.74
ECON	24	2.50	0.98	4.21	1.61	3	9	0.11	0.06	0.68
ECON202	17	2.41	1.06	4.35	1.66	3	9	0.25	0.01	0.96
ECON204*	7	2.71	0.76	3.86	1.57	3	7			
FSHN	73	3.05	0.92	7.23	5.31	3	27	0.11	0.00	0.89
FSHN350	26	3.17	0.69	3.88	1.51	3	10	0.29	0.00	0.99
FSHN470**	47	2.98	1.03	9.09	5.76	3	27	0.08	0.01	0.77
LIFE	18	3.06	0.92	5.44	1.95	3	11	0.15	-0.13	0.32
LIFE103**	7	2.71	0.76	5.71	2.69	3	11			
LIFE201B**	5	2.53	1.02	5.20	0.84	3	6			
LIFE212*	6	3.89	0.27	5.33	1.86	3	8			
MATH	17	3.04	1.13	6.22	3.15	3	12	0.02	-0.04	0.71
MATH141	14	2.86	1.17	6.40	3.36	3	12	0.15	-0.05	0.67
MATH155**	3	3.89	0.19	5.33	2.08	3	7			
STAT301	12	2.70	1.36	4.67	2.02	3	9	0.13	0.16	0.41
Total	292	2.83	0.95	6.10	3.74	3	27	0.04	-0.01	0.51

Note: Regression analysis was not conducted for any study group course with less than 10 participants.

* = Fall semester only; ** = Spring semester only

*TILT: Assessment of Study Groups AY 2014-2015***4. Research Question: What are the demographic characteristics of students who participate in the study group program compared to students who do not participate?**

- Among all courses, there were 296 study group cases; however, several students attended study group for multiple courses. Therefore, there were 282 unique study group participants (see Figure 2). The comparison group (non-study group participants) were students in those courses during the same term who did not attend study group (N = 11,520).
- Compared to non-study group participants enrolled in the same courses for the respective term during academic year 2014-2015, the demographic characteristics indicate women were disproportionately represented as study group participants (68.6% of study group participants vs. 49% of non-study group) while men were underrepresented (31.4% vs. 51% respectively) (see Table 4).
- STEM majors (72% of study group participants vs. 56% of non-study group participants) were well represented; however, there were lower proportions of students with a minority race or ethnicity (15.5% of study group participants vs. 19.1% of non-study participants) and international students (1.4% of participants and 5% of non-participants). There were equal percentages of first generation students who participated in study groups and first generation non-participants (23%) (see Tables 5 and 7).
- Over a third (36%) of study group participants were sophomores (38% of non-study group participants were sophomores). Seniors were disproportionately represented (24% of study group participants and 9.8% of non-participants), while freshmen were disproportionately underrepresented (19% of study group participants, yet 34% of non-participants) (see Table 6).
- About a third of students who participated in the study group program were from Health and Human Sciences (34.5%) and about a quarter were from Engineering (24%). Students with majors in Agricultural Sciences, Business, Liberal Arts, and Warner College of Natural Resources each comprised less than 5% of the study group program participants (see Table 8).



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Figure 2. Number of study group participants receiving services for multiple courses

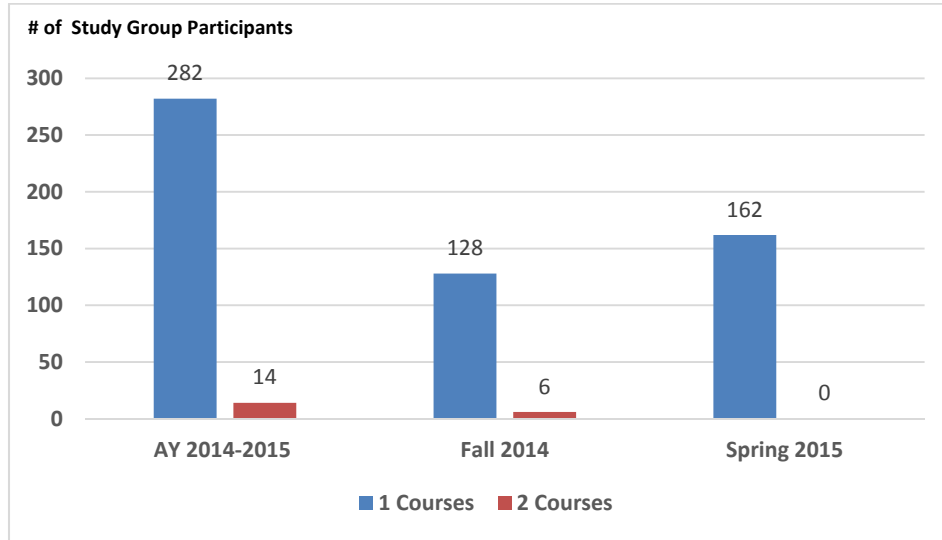
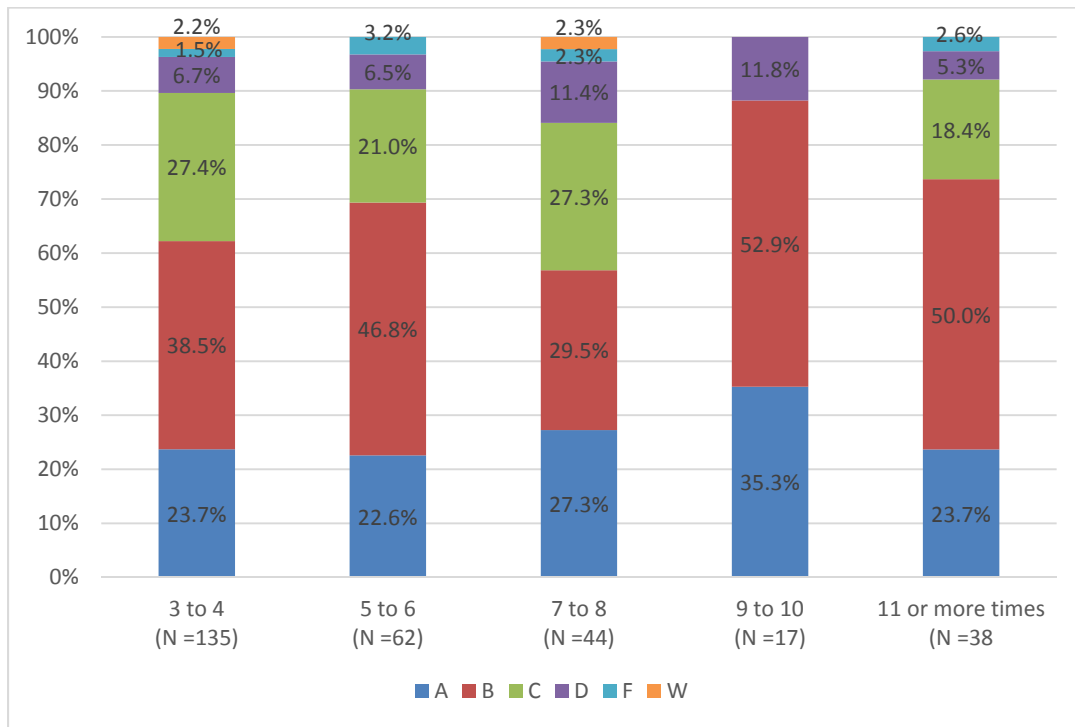


Figure 3. Course grade by number of study group visits





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Table 4. Gender proportions for study group program participants and non-study group program participants.

Gender		# Study Group Participants	% of Study Group Participants	# Non-Study Group Participants	% of Non-Study Group Participants
Female	AY14-15	203	68.6%	5,649	49%
	FA14	105	64.8%	3,147	47.8%
	SP15	98	73.1%	2,502	50.7%
Male	AY14-15	93	31.4%	5,871	51%
	FA14	57	35.2%	3,441	52.2%
	SP15	36	26.9%	2,430	49.3%

Table 5. Student characteristic proportions for study group program participants and non-study group program participants.

Student Characteristics		# Study Group Participants	% of Study Group Participants	# Non-Study Group Participants	% of Non-Study Group Participants
First Generation Students	AY14-15	67	22.6%	2,624	22.8%
	FA14	35	21.6%	1,480	22.5%
	SP15	32	23.9%	1,144	23.2%
CO Residents	AY14-15	227	76.7%	8,398	72.9%
	FA14	129	79.6%	4,885	74.1%
	SP15	98	73.1%	3,513	71.2%
STEM Majors	AY14-15	213	72%	6,417	55.7%
	FA14	109	67.3%	3,457	52.5%
	SP15	104	77.6%	2,960	60%



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Table 6. Student level proportions for study group program participants and non-study group program participants.

Student level		# Study Group Participants	% of Study Group Participants	# Non-Study Group Participants	% of Non-Study Group Participants
Freshmen	AY14-15	55	18.6%	3,905	33.9%
	FA14	39	24.1%	2,106	32.5%
	SP15	16	11.9%	1,799	36.5%
Sophomore	AY14-15	107	36.1%	4,330	37.6%
	FA14	72	44.4%	2,550	38.7%
	SP15	35	26.1%	1,780	36.1%
Junior	AY14-15	60	20.3%	2,073	18%
	FA14	37	22.8%	1,174	17.8%
	SP15	23	17.2%	899	18.2%
Senior	AY14-15	72	24.3%	1,131	9.8%
	FA14	13	8%	708	10.7%
	SP15	59	44%	423	8.6%
Graduate	AY14-15	2	.7%	81	.7%
	FA14	1	.6%	50	.8%
	SP15	1	.7%	31	.6%



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Table 7. Ethnicity and Minority status proportions for study group program participants and non-study group program participants.

Ethnicity/Minority Status and Year		# Study Group Participants	% of Study Group Participants	# Non-Study Group Participants	% of Non-Study Group Participants
Minority Student	AY14-15	46	15.5%	2,198	19.1%
	FA14	26	16%	1,227	18.6%
	SP15	20	14.9%	971	19.7%
Asian	AY14-15	5	1.7%	320	2.8%
	FA14	5	3.1%	175	2.7%
	SP15	0	0%	145	2.9%
Black	AY14-15	5	1.7%	235	2%
	FA14	2	1.2%	133	2%
	SP15	3	2.2%	102	2.1%
Hawaiian/PI	AY14-15	0	0%	12	.1%
	FA14	0	0%	6	.1%
	SP15	0	0%	6	.1%
Hispanic	AY14-15	30	10.1%	1288	11.2%
	FA14	15	9.3%	709	10.8%
	SP15	15	11.2%	579	11.7%
Multi-Racial	AY14-15	5	1.7%	270	2.3%
	FA14	4	2.5%	170	2.6%
	SP15	1	.7%	100	2%
Native Amer.	AY14-15	1	.3%	73	.6%
	FA14	0	0%	34	.5%
	SP15	1	1.7%	39	.8%
White	AY14-15	236	79.7%	8435	73.2%
	FA14	127	78.4%	4841	73.5%
	SP15	109	81.3%	3594	72.9%
International	AY14-15	4	1.4%	565	4.9%
	FA14	1	.6%	303	4.6%
	SP15	3	2.2%	262	5.3%
No Response	AY14-15	10	3.4%	322	2.8%
	FA14	127	78.4%	217	3.3%
	SP15	109	81.3%	105	2.1%



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Table 8. College major proportions for study group program participants and non-study group program participants.

College and Year		# Study Group Participants	% of Study Group Participants	# Non-Study Group Participants	% of Non-Study Group Participants
Agricultural Sciences	AY14-15	10	3.4%	638	5.5%
	FA14	2	1.2%	370	5.6%
	SP15	8	6%	268	5.4%
Business	AY14-15	10	3.4%	854	7.4%
	FA14	6	3.7%	564	8.6%
	SP15	4	3%	290	5.9%
Engineering	AY14-15	70	23.6%	1,344	11.7%
	FA14	43	26.5%	902	13.7%
	SP15	27	20.1%	442	9%
Health & Human Sciences	AY14-15	102	34.5%	1,748	15.2%
	FA14	41	26.5%	998	15.1%
	SP15	61	45.5%	750	15.2%
Intra-University	AY14-15	24	8.1%	2,037	17.7%
	FA14	16	9.9%	1,181	17.9%
	SP15	8	6%	856	17.4%
Liberal Arts	AY14-15	7	2.4%	601	5.2%
	FA14	3	1.9%	426	6.5%
	SP15	4	3%	175	3.5%
Natural Sciences	AY14-15	40	13.5%	2,647	23%
	FA14	29	17.9%	1,332	20.2%
	SP15	11	8.2%	1,315	26.7%
Veterinary Med. & Biomed. Sci.	AY14-15	24	8.1%	868	7.5%
	FA14	20	12.3%	475	7.2%
	SP15	4	3%	393	8%
Warner College of Natural Res.	AY14-15	9	3%	783	6.8%
	FA14	2	1.2%	340	5.2%
	SP15	7	5.2%	443	9%