

Efficacy of TILT Study Groups

The Institute for Learning and Teaching (TILT) provided academic support via the study group program to 266 unique students (279 cases of students participating in study group for distinctive courses) for fifteen lower-level undergraduate courses in the 2013-14 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 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 and no significant differences between average CCHE index scores. Further, 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 is also evidence that frequent study group visits positively impacts a student's course grade compared to students who do not attend study group as frequently.

Interpreting the Results: Please note the small group sizes for most individual courses make it difficult to extrapolate significant results. Analyses conducted in aggregate will be more accurate than those analyses conducted at the individual course level. A bolded number with a green or orange highlight indicates a statistically significant ($p < .05$) difference between study group participants and non-study group Participants. A bolded number without a highlight designates statistically significant at a $p < .10$ level. The smaller the p-value, the less likely the results are due to chance. Stated otherwise, smaller p-values indicate more significant results. Course grade can be interpreted as follows: A = 4.0, B = 3.0, C = 2.0, D = 1.0, F = 0.

¹ There were 291 cases initially. Five cases included the same ID and course and therefore their records were combined (n = 286). Additionally, seven cases were excluded after their study group course did not match a registered course for that term (n = 279).

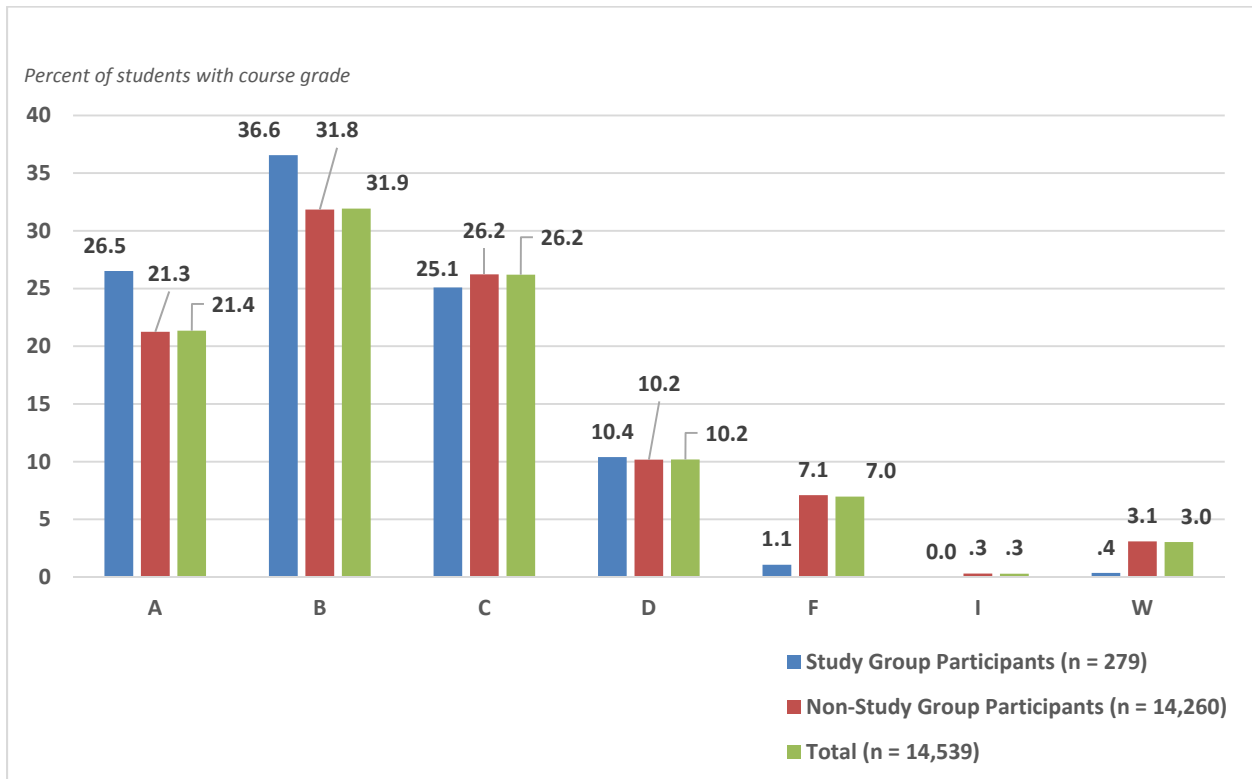
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Research Question: Do students who participate in the TILT study group programs earn higher course grades than those students who do not participate?

- Looking at all study group participants for the 2013-2014 academic year, students who participated in study groups received significantly higher course grades on average when compared to non-study group participants ($d = .25$). There was no overall significant difference in index scores between study group and non-study group participants (see Table 1).
- Examining individual courses, study group participants had significantly higher ($p < .05$) average grades in ART 100, CHEM 341, ECON 202 (for both terms combined), LIFE 102, LIFE 203, and MATH 141.

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.

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'.

Table 1. Academic Year 2013-14: Average course grade and CCHE index across study group program participant status and course.

Course	Study Group Participants			Non-Study Group Participants			<i>d</i>
	N	Average Course Grade	Average CCHE Index	N	Average Course Grade	Average CCHE Index	
ART 100*	7	3.86	114.50	736	2.90	111.08	1.16
BC 351**	4	3.00	118.33	365	2.88	120.27	
BZ 110*	13	2.26	113.30	256	2.05	111.38	
CHEM 111	36	1.93	116.19	2,130	2.09	118.80	
CHEM 111*	19	1.77	115.80	1281	2.10	120.58	
CHEM 111**	17	2.12	116.56	849	2.07	115.90	
CHEM 113	33	2.21	116.03	1,339	2.15	120.43	-0.40
CHEM 113*	16	2.35	116.80	575	2.08	118.09	
CHEM 113**	17	2.08	115.27	764	2.20	122.11	-0.58
CHEM 341*	27	3.12	125.45	331	2.51	124.36	0.64
ECON 202	16	2.88	112.75	1,828	2.48	113.38	0.47
ECON 202*	4	3.25	129.00	961	2.64	113.70	
ECON 202**	12	2.75	111.27	867	2.30	113.03	
FSHN 350**	6	3.61	124.50	124	3.22	117.85	
LIFE 102*	74	3.01	114.84	1,319	2.59	115.95	0.40
LIFE 203**	3	4.00	119.67	78	3.29	123.43	1.20
LIFE 212*	9	3.56	121.71	114	3.61	127.99	
MATH 141**	17	2.71	111.31	602	2.29	111.38	0.42
PH 121*	15	2.71	112.36	444	2.99	119.82	-0.66
PH 122**	15	3.20	112.70	390	3.18	121.95	-0.96
STAT 301**	4	3.42	123.50	504	2.78	117.17	
Total	279	2.79	116.05	10,560	2.52	116.32	0.25

*= Fall 2013 semester only; ** = Spring 2014 semester only

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 do not participate in the study group program when looking above and beyond the impact of index (average of a .31 grade point increase). In particular, study group participants for LIFE 102 had significantly higher course grades after controlling for index (see Table 2).
- Students who were in study group for Chemistry and Life classes (categorized in aggregate due to the small sample sizes) had significantly ($p < .05$) higher course grade (average increase of .22 and .49 course grade points respectively) compared to those students in the same courses who did not participate in a study group.

Interpreting the Results (Table 2 and 3):

- 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 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. A bolded p -value indicates statistical significance at the $p < .10$ level.
- As mentioned previously, some course results are very limited due to the small number of study group participants in each course. 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).

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

AY 13-14					
Course	Study group Participants (n)	Non-study group Participants (n)	R ²	B	p
ART 100*	7	736	0.12	0.80	0.06
BC 351**	4	365	0.02	-0.21	0.74
BZ 110*	13	256	0.17	0.04	0.90
CHEM	96	3,800	0.24	0.22	0.03
CHEM 111	36	2,130	0.26	-0.03	0.87
CHEM 113	33	1,339	0.22	0.23	0.21
CHEM 341*	27	331	0.11	0.39	0.07
ECON 202	16	1,828	0.17	0.38	0.16
FSHN 350**	6	124	0.20	0.41	0.25
LIFE	86	1,511	0.37	0.49	0.00
LIFE 102*	74	1,319	0.35	0.51	0.00
LIFE 203**	3	78	0.22	0.73	0.07
LIFE 212*	9	114	0.12	-0.09	0.69
MATH 141**	17	602	0.09	0.49	0.08
PH	30	834	0.21	0.27	0.14
PH 121*	15	444	0.22	0.23	0.40
PH 122**	15	390	0.20	0.29	0.22
STAT 301**	4	504	0.21	0.07	0.92
Total	279	10,560	17.00	0.31	0.00

*= Fall 2013 semester only; ** = Spring 2014 semester only

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 2013-2014 academic year, the number of visits to study group positively and significantly ($p = .00$) impacted course grade after controlling for a student’s CCHE Index among study group participants. In particular, a higher number of study group visits positively impacted course grade for Chemistry and Life classes when examined in aggregate and for CHEM 341 and LIFE 102 at the individual class level. Additionally, an increase in the number of visits to study group for CHEM 113, FSHN 350, and PH 121 had positive directional impact ($p < .10$) on course grade compared to less visits for those courses (see Table 3).
- On average, over both semesters, a study group participant visited 6.25 times per class on average. Study group participants for the PH 121, CHEM 113, ECON 202, and STAT 301 visited more than 7 times on average for each course. STAT 301 had the most frequent participation (four students) averaging 8.75 study group visits.

Table 3. AY 2013-2014: Linear regression results: Predicting final grades of study group participants based on number of study group visits after controlling for CCHE index.

AY 2013-2014								
Course	Tutoring Participants (n)	Average Grade Points	Avg. Grade Points Std. Dev.	Average # of Visits	Avg # of Visits: Std. Deviation	R ²	B	p
ART 100*	7	3.86	0.38	4.43	1.90	0.13	-0.07	0.68
BC 351**	4	3.00	1.41	4.50	1.73			
BZ 110*	13	2.26	1.06	4.15	1.14	0.81	0.17	0.34
CHEM	96	2.37	0.99	6.19	3.44	0.26	0.10	0.00
CHEM 111	36	1.93	0.74	5.06	2.88	0.09	0.05	0.19
CHEM 113	33	2.21	1.00	7.15	3.97	0.33	0.08	0.07
CHEM 341*	27	3.12	0.83	6.52	3.12	0.26	0.13	0.02
ECON 202	16	2.88	0.62	7.75	5.58	0.57	0.02	0.39
FSHN 350**	6	3.61	0.68	5.83	1.72	0.99	0.29	0.08
LIFE	86	3.10	0.94	6.45	3.54	0.25	0.04	0.00
LIFE 102*	74	3.01	0.94	6.80	3.63	0.30	0.10	0.00
LIFE 203**	3	4.00	0.00	4.00	1.00			
LIFE 212*	9	3.56	0.88	4.44	2.19	0.55	1.56	0.16
MATH 141**	17	2.71	0.77	5.35	2.69	0.03	0.10	0.52
PH	30	2.96	0.66	6.90	2.81	0.22	0.04	0.28
PH 121*	15	2.71	0.80	7.00	2.17	0.4882	0.17	0.07
PH 122**	15	3.20	0.37	6.80	3.41	0.14	0.00	0.93
STAT 301**	4	3.42	0.42	8.75	10.84			
Total	279	2.79	0.97	6.25	3.60	0.17	0.08	0.00

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

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 279 study group cases; however, several students attended study group for multiple courses. Therefore, there were 266 unique study group participants. The comparison group (non-study group participants) were students in those classes of interest (n = 9,043).
- Compared to non-study group participants enrolled in the same courses for the respective term during the academic year 2013-2014, the demographic characteristics indicate women were disproportionately represented as study group participants (71.4% of study group participants vs. 51.3% of non-study group) while men were underrepresented (28.6% vs. 48.7% respectively) (see Table 4).
- STEM majors (56.4% of study group participants vs. 50.4% of non-study group participants), Pell recipients (16.2% vs. 12.1%), and minority students (22.6% vs. 18.5%) were all well represented as study group participants compared to those students in the same courses who were non-study group participants; however, there were lower proportions of white (70.3% vs. 73.3%) and international students (1.5% vs 3.5%) (see Tables 5 and 7) as study group participants compared to those students who were non-study group participants.
- Over half of study group participants were freshmen (50.8% of study group participants, but only 36.3% of non-study group participants) and over a fifth were sophomores (21.4% vs. 29.2% of non-participants) (see Table 6).
- About a third of students who participated in the study group program were from the college of Natural Sciences (33.1%). Students with majors in Business, Engineering, and Liberal Arts 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

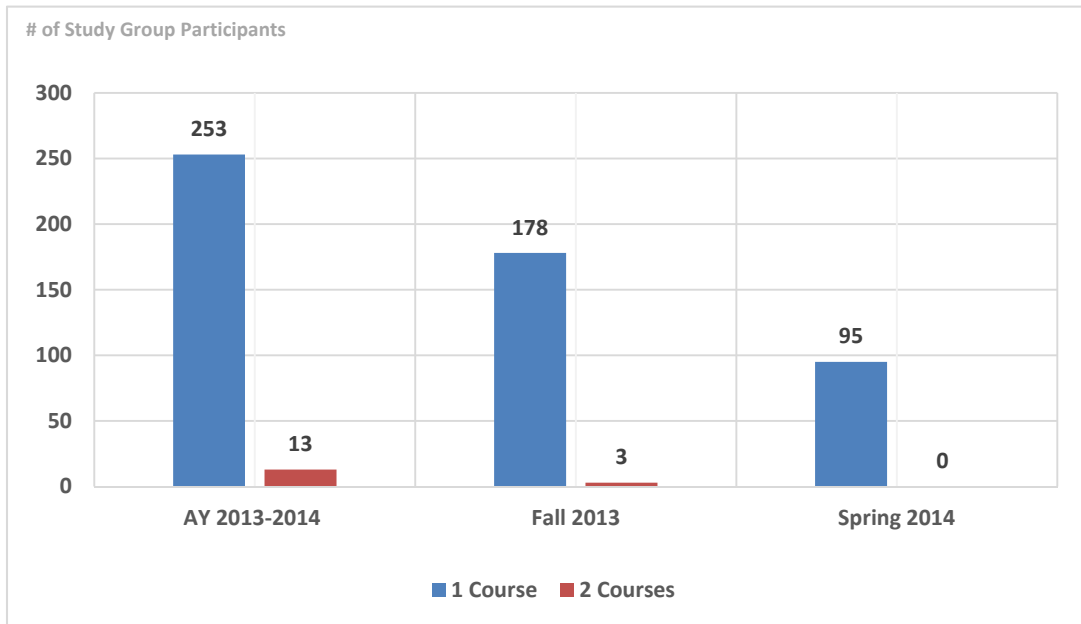


Table 4. Gender proportions for study group program participants and non-study group program participants.

Gender		Study Group Participants	% of Study Group Participants	Non-Study Group Participants	% of Non-Study Group Participants
Female	AY13-14	190	71.4	4,637	51.3
	FA13	135	74.6	3,371	53.0
	SP14	65	68.4	2,780	51.9
Male	AY13-14	76	28.6	4,406	48.7
	FA13	46	25.4	2,992	47.0
	SP14	30	31.6	2,579	48.4

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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	AY13-14	66	24.8	2,259	25.0
	FA13	48	26.5	1,564	24.6
	SP14	21	22.1	1,346	25.1
Residents	AY13-14	192	72.2	6,709	74.2
	FA13	122	67.4	4,649	73.1
	SP14	77	81.1	3,975	74.2
STEM Majors	AY13-14	150	56.4	4,558	50.4
	FA13	106	58.6	3,445	54.1
	SP14	50	52.6	2,807	52.4
Pell Recipients	AY13-14	43	16.2	1,097	12.1

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	AY13-14	135	50.8	3,283	36.3
	FA13	99	54.7	2,604	40.9
	SP14	43	45.3	1,741	32.5
Sophomore	AY13-14	57	21.4	2,639	29.2
	FA13	42	23.2	1,770	27.8
	SP14	17	17.9	1,668	31.1
Junior	AY13-14	32	12.0	1,663	18.4
	FA13	22	12.2	1,098	17.3
	SP14	10	10.5	1,033	19.3
Senior	AY13-14	41	15.4	1,412	15.6
	FA13	17	9.4	862	13.5
	SP14	25	26.3	897	16.7
Graduate	AY13-14	1	0.4	46	0.5
	FA13	1	0.6	29	0.5
	SP14	0	0.0	20	0.4

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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	AY13-14	60	22.6	1,671	18.5
	FA13	45	24.9	1,191	18.7
	SP14	18	18.9	1,031	19.2
Asian	AY13-14	8	3.0	197	2.2
	FA13	5	2.8	147	2.3
	SP14	3	3.2	137	2.6
Black	AY13-14	12	4.5	175	1.9
	FA13	7	3.9	118	1.9
	SP14	5	5.3	109	2.0
Hawaiian/PI	AY13-14	0	0.0	5	0.1
	FA13	0	0.0	3	0.0
	SP14	0	0.0	4	0.1
Hispanic	AY13-14	27	10.2	940	10.4
	FA13	22	12.2	665	10.5
	SP14	7	7.4	561	10.5
Multi-Racial	AY13-14	13	4.9	320	3.5
	FA13	0	0.0	235	3.7
	SP14	3	3.2	198	3.7
Native Amer.	AY13-14	0	0.0	34	0.4
	FA13	0	0.0	23	0.4
	SP14	0	0.0	22	0.4
White	AY13-14	187	70.3	6,626	73.3
	FA13	122	67.4	4,692	73.7
	SP14	72	75.8	3,864	72.1
International	AY13-14	4	1.5	321	3.5
	FA13	4	2.2	167	2.6
	SP14	0	0.0	226	4.2
No Response	AY13-14	15	5.6	425	4.7
	FA13	10	5.5	313	4.9
	SP14	5	5.3	238	4.4

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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	AY13-14	26	9.8	598	6.6
	FA13	25	13.8	448	7.0
	SP14	3	3.2	336	6.3
Business	AY13-14	11	4.1	464	5.1
	FA13	2	1.1	309	4.9
	SP14	9	9.5	260	4.9
Engineering	AY13-14	8	3.0	932	10.3
	FA13	5	2.8	733	11.5
	SP14	3	3.2	436	8.1
Health & Human Sciences	AY13-14	60	22.6	1,809	20.0
	FA13	38	21.0	1,163	18.3
	SP14	23	24.2	1,105	20.6
Intra-University	AY13-14	36	13.5	1,426	15.8
	FA13	25	13.8	922	14.5
	SP14	14	14.7	838	15.6
Liberal Arts	AY13-14	5	1.9	585	6.5
	FA13	3	1.7	347	5.5
	SP14	2	2.1	282	5.3
Natural Sciences	AY13-14	88	33.1	2,037	22.5
	FA13	59	32.6	1,545	24.3
	SP14	33	34.7	1,316	24.6
Veterinary Med. & Biomed. Sci.	AY13-14	17	6.4	528	5.8
	FA13	15	8.3	449	7.1
	SP14	2	2.1	388	7.2
Warner College of Natural Res.	AY13-14	15	5.6	664	7.3
	FA13	9	5.0	447	7.0
	SP14	6	6.3	398	7.4