

Efficacy of TILT Study Groups

TILT provided academic support via study groups to 346 students across nine lower-level undergraduate courses in the 2012-13 academic year. To quantify the efficacy of the study group program, the current analysis compares the course grades of study group 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.

In general, results suggest participation in study groups will boost the average student's grade for the course. Overall, students who participated in the study group program during the academic year 2012-2013 had a lower average CCHE index score, yet received higher course grades when compared to those students in the same courses who did not participate.

Results interpretation: 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 (with the exception of LIFE 102). 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 means 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.

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

Table 1. Fall 2012: Average course grade and CCHE index across study group participant status and course.

Course	Study Group Participants			Non-Study Group Participants			d
	N	Average Course Grade	Average CCHE Index	N	Average Course Grade	Average CCHE Index	
BZ 110	13	2.97	113.92	275	2.31	112.41	.63
CHEM 111	8	2.29	118.29	1297	1.94	119.85	
ECON 202	12	3.08	109.88	984	2.56	114.26	.61
HES 207	10	2.70	112.11	293	2.23	111.06	
LIFE 102	170	3.08	114.34	1233	2.47	115.86	.56
LIFE 103	5	2.40	106.00	232	2.45	116.08	
MATH 160	6	2.00	122.17	421	1.67	120.83	
MATH 161	22	2.57	112.78	353	2.38	119.93	.49
PH 121	25	3.27	115.83	414	3.11	119.74	
Total	271	2.99		5502	2.35		.61
			114.26			117.05	.24

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Table 2. Spring 2013: Average course grade and CCHE index across study group 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	8	3.17	109.60	545	2.98	110.60	
CHEM 111	6	2.45	108.00	887	1.95	114.86	
HES 207	9	2.88	111.67	246	2.20	111.50	
LIFE 102	8	2.83	105.71	721	2.62	112.83	.22
LIFE 103	3	2.67	115.50	476	2.46	118.16	
LIFE 201B	7	2.05	119.71	156	2.56	124.08	
LIFE 203	12	3.50	119.00	58	3.44	124.02	
MATH 160	2	3.17	105.00	343	1.76	115.26	
MATH 161	3	3.00	119.50	335	2.51	121.57	
PH 121	12	2.73	121.20	215	2.62	116.87	
PH 122	5	3.47	118.75	393	3.26	120.88	
Total	75	2.91	114.25	4375	2.48	115.81	.42

Table 3. Academic Year 2012-13: Average course grade and CCHE index across study group 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	
Total	346	2.97		9877	2.41		.54
			114.26			116.51	.19

Table 4. Academic Year 2012-13: Average course grade and CCHE index across study group participant status for courses offered both fall and spring terms.

Course	Study Group Participants			Non-Study Group Participants			<i>d</i>
	N	Average Grade Points	Average CCHE Index	N	Average Grade Points	Average CCHE Index	
CHEM 111	14	2.36	114.00	2184	1.94	117.90	
HES 207	19	2.78	111.89	539	2.22	111.27	.50
LIFE 102	178	3.07	113.98	1954	2.52	114.77	.52
LIFE 103	8	2.50	108.71	708	2.45	117.52	.88
MATH 160	8	2.39	119.71	764	1.72	118.39	
MATH 161	25	2.63	113.45	688	2.45	120.76	.51
PH 121	37	3.10	116.76	629	2.95	118.77	

For statistically significant results ($p < .10$) level, an effect size, Cohen’s *d*, is included. An effect size is 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.

- Looking at all study group participants for the 2012-2013 academic year, students who participated in study groups received significantly higher course grades on average ($d = .54$) compared to non-study group participants despite having significantly lower index scores on average ($d = .19$).
- Examining individual courses over both terms, study group participants had significantly higher ($p < .05$) average grades in LIFE 102 ($d = .52$) compared to non-study group participants.

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

Results Interpretation: The beta coefficient, B, represents the association between course grade and study group participation after controlling for CCHE index. For instance, a coefficient of .76 can be interpreted as study group participation results in an average increase of .76 points in their final course grade after controlling for a student's index. A bolded and green highlighted 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.

Table 5. Fall 2012: Linear regression results: Predicting final grade based on study group participation after controlling for CCHE index.

Fall 2012					
Course	Study Group Participants (n)	Non-Study Group Participants (n)	R ²	B	p
BZ 110	13	275	0.25	0.58	0.06
CHEM 111	8	1297	0.30	0.38	0.29
ECON 202	12	984	0.20	0.60	0.05
HES 207	10	293	0.22	0.36	0.34
LIFE Courses	175	1465	0.34	0.74	0.00
LIFE 102	170	1233	0.36	0.75	0.00
LIFE 103	5	232	0.25	0.40	0.34
MATH Courses	28	774	0.15	0.77	0.00
MATH 160	6	421	0.22	0.80	0.89
MATH 161	22	353	0.12	0.60	0.03
PH 121	25	414	0.32	0.22	0.12
FA12 Total	271	5502	0.22	0.76	0.00

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Table 6. Spring 2013: Linear regression results: Predicting final grade based on study group participation after controlling for CCHE index.

Spring 2013					
Course	Study Group Participants (n)	Non-Study Group Participants (n)	R ²	B	p
ART 100	8	545	0.08	0.36	0.45
CHEM 111	6	887	0.12	0.84	0.05
HES 207	9	246	0.12	0.61	0.12
LIFE Courses	30	2876	0.21	0.63	0.01
LIFE 102	8	721	0.23	0.40	0.27
LIFE 103	3	476	0.22	0.17	0.79
LIFE 201B	7	156	0.33	-0.22	0.57
LIFE 203	12	58	0.20	0.46	0.15
MATH Courses	5	678	0.08	1.02	0.14
MATH 160	2	343	0.04	1.55	0.21
MATH 161	3	335	0.06	0.57	0.48
PH Courses	17	608	0.32	0.11	0.12
PH 121	12	215	0.12	0.27	0.60
PH 122	5	393	0.13	0.11	0.76
SP13 Total	75	4375	0.12	0.49	0.00

Table 7. Academic Year 2012-13: Linear regression results: Predicting final grade based on study group participation after controlling for CCHE index for those courses offered in both fall and spring.

AY 2012-2013					
Course	Study Group Participants (n)	Non-Study Group Participants (n)	R ²	B	p
CHEM 111	14	2184	0.21	0.62	0.03
HES 207	19	539	0.17	0.48	0.08
LIFE Courses	198	2720	0.28	0.66	0.00
LIFE 102	178	1954	0.30	0.62	0.00
LIFE 103	8	708	0.23	0.36	0.30
MATH Courses	33	1452	0.11	0.72	0.03
MATH 160	8	764	0.10	0.40	0.45
MATH 161	25	688	0.08	0.53	0.04
PH 121	37	629	0.24	0.31	0.05
AY12-13 Total	346	9877	0.17	0.66	0.00

As mentioned previously, course results are somewhat limited by the small number of study group participants in each course; however, there were still some noteworthy findings:

- For CHEM 111 over both terms, study group participation is associated with an average increase of .62 points in their course grade after controlling for CCHE index compared to non-study group students.
- For LIFE 102 over both terms, study group participation is associated with an average increase of .62 points in their course grade after controlling for CCHE index compared to non-study group students.
- For MATH 161 over both terms, study group participation is associated with an average increase of .53 points in their course grade after controlling for CCHE index compared to non-study group students.
- For all courses, study group participation is associated with an average increase of .66 points in their course grade after controlling for CCHE index compared to non-study group students.

Research Question: What are the demographic characteristics of students who participate in the study group program compared to students who do not participate?

- Compared to non-study group participants enrolled in study group courses for the appropriate term, the demographic characteristics suggest women (68.5% of study group vs. 50.6% of non-study group) were over represented and men were underrepresented (31.5% vs. 49.4% respectively).
- Higher proportions of first generation students (29.8% vs. 25.6% of non-study group), minority students (22.3% vs. 17.8% of non-study group), and freshmen (56.6% vs. 50.2% of non-study group) were study group participants compared to the proportions of students in the same courses who were not study group participants.
- Almost a third of the study group participants have a major in the college of Natural Sciences (32.4% vs. 26.8% of non-study group participants), while a quarter (24.9%) have a major in the college of Health and Human Sciences (vs. less than a fifth (19.3%) of non-study group). Only 6.2% of study group participants were in the college of Engineering compared to 16.2% of non-study group participants.

Table 8. Gender proportions for study group participants and non-study group participants.

Gender		Study Group Participants	% of Study Group	Non-Study Group Participants	% of Non-Study Group
Female	AY12-13	237	68.5%	4997	50.6%
	FA12	197	72.7%	2746	49.9%
	SP13	40	53.3%	2251	51.5%
Male	AY12-13	109	31.5%	4880	49.4%
	FA12	74	27.3%	2756	50.1%
	SP13	35	46.7%	2124	48.5%

Table 9. Student characteristic proportions for study group participants and non-study group participants.

Student Characteristics	Study Group Participants	% of Study Group	Non-Study Group Participants	% of Non-Study Group	
First Generation Students	AY12-13	103	29.8%	2528	25.6%
	FA12	83	30.6%	1369	24.9%
	SP13	20	26.7	1159	26.5%
Residents	AY12-13	266	76.9%	7398	74.9%
	FA12	203	74.9%	4111	74.7%
	SP13	63	84.0%	3287	75.1%
STEM Majors	AY12-13	186	53.8%	5239	53.0%
	FA12	144	53.1%	2915	53.0%
	SP13	42	56.0%	2324	53.1%

Table 10. Student level proportions for study group participants and non-study group participants.

Student level		Study Group Participants	% of Study Group	Non-Study Group Participants	% of Non - Study Group
Freshman	AY12-13	196	56.6%	4955	50.2%
	FA12	166	61.3%	2927	53.2%
	SP13	30	40.0%	2028	46.4%
Sophomore	AY12-13	82	23.7%	2632	26.6%
	FA12	62	22.9%	1485	27.0%
	SP13	20	26.7%	1147	26.2%
Junior	AY12-13	34	9.8%	1272	12.9%
	FA12	22	8.1%	657	11.9%
	SP13	12	16.0%	615	14.1%
Senior	AY12-13	32	9.2%	1010	10.2%
	FA12	19	7.0%	429	7.8%
	SP13	13	17.3%	581	13.3%
Graduate	AY12-13	2	0.6%	8	0.1%
	FA12	2	0.7%	4	0.1%
	SP13	0	0.0%	4	0.1%

Table 11. Ethnicity and Minority status proportions for study group participants and non-study group participants.

Ethnicity/Minority Status and Year		Study Group Participants	% of Study Group	Non-Study Group Participants	% of Non-Study Group
Minority Student	AY12-13	77	22.3%	1760	17.8%
	FA12	65	24.0%	915	16.6%
	SP13	12	16.0%	845	19.3%
Hispanic	AY12-13	41	11.8%	932	9.4%
	FA12	36	13.3%	482	8.8%
	SP13	5	6.7%	450	10.3%
Asian	AY12-13	6	1.7%	202	2.0%
	FA12	5	1.8%	104	2.0%
	SP13	1	1.3%	98	2.2%
Multi-Racial	AY12-13	18	5.2%	365	3.7%
	FA12	14	5.2%	199	3.6%
	SP13	4	5.3%	166	3.8%
Black	AY12-13	11	3.2%	225	2.3%
	FA12	10	3.7%	109	2.0%
	SP13	1	1.3%	116	2.7%
Native Amer.	AY12-13	1	0.3%	30	0.3%
	FA12	0	0.0%	20	0.4%
	SP13	1	1.3%	10	0.2%
Hawaiian/PI	AY12-13	0	0.0%	6	0.1%
	FA12	0	0.0%	1	0.0%
	SP13	0	0.0%	5	0.1%
White	AY12-13	243	70.2%	7253	73.4%
	FA12	188	69.4%	4126	75.0%
	SP13	55	73.3%	3127	71.5%
International	AY12-13	8	2.3%	288	2.9%
	FA12	7	2.6%	139	2.5%
	SP13	1	1.3%	149	3.4%
No Response	AY12-13	18	5.2%	576	5.8%
	FA12	11	4.1%	322	5.9%
	SP13	7	9.3%	254	5.8%

Table 12. College major proportions for study group participants and non-study group participants.

College and Year		Study Group Participants	% of Study Group	Non-Study Group Participants	% of Non-Study Group
Agricultural Sciences	AY12-13	24	6.9%	462	4.7%
	FA12	23	8.5%	260	4.7%
	SP13	1	1.3%	202	4.6%
Business	AY12-13	2	0.6%	244	2.5%
	FA12	2	0.0%	178	3.2%
	SP13	0	0.0%	66	1.6%
Engineering	AY12-13	21	6.1%	1597	16.2%
	FA12	18	6.6%	993	18.0%
	SP13	3	4.0%	604	13.8%
Health & Human Sciences	AY12-13	86	24.9%	1909	19.3%
	FA12	68	25.1%	989	18.0%
	SP13	18	24.0%	920	21.0%
Intra-University	AY12-13	48	13.9%	1554	15.7%
	FA12	36	13.3%	896	16.3%
	SP13	12	16.0%	658	15.0%
Liberal Arts	AY12-13	11	3.2%	395	4.0%
	FA12	9	3.3%	232	4.2%
	SP13	2	2.0%	163	3.7%
Natural Sciences	AY12-13	112	32.4%	2647	26.8%
	FA12	83	30.6%	1341	24.4%
	SP13	29	38.7%	1306	29.9%
Veterinary Med. & Biomed. Sci.	AY12-13	24	6.9%	624	6.3%
	FA12	17	6.3%	321	5.8%
	SP13	7	9.3%	303	6.9%
Warner College of Natural Res.	AY12-13	18	5.2%	445	4.5%
	FA12	15	5.5%	292	5.3%
	SP13	3	4.0%	153	3.5%