

STEM Project Internal Evaluation

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Correlations and Statistical Tests of Q2, Q3, Q4 and Q5 Math Success Center Survey – Fall 2009

Q2: what grade do you expect for this class this semester?

Q3: On average, how many hours per week did you visit the Success Center?

Q4: On average, how many times per week did you visit the Success Center?

Q5: In general, do you feel the Success Center has helped to improve your grade?

Summary:

1. Descriptive statistics show that students usually expected higher grades (Q2), visited the Center longer hours (Q3) and more frequently per week (Q4) when they felt the Success Center have helped to improve their grades (answered “Yes”).
2. There is a positive correlation between feeling the Success Center has helped to improve students’ grades (Q5) and the level of grades the students expected (Q2). Also, there is a significant difference in the level of expected grades between the two groups of students who answered “Yes” and “No” for Q5 ($z=2.193$, $p= 0.000$). The median level of grades for the group of students who felt the Success Center has helped them to improve their grades (answered “yes”) is 4.0 (equal to A) and the median level of grades for the group of students who felt the Success Center has not helped them to improve their grades (answered “no”) is 1.5 (lower than C).
3. There is a positive correlation between the number of hours per week a student visited the Success Center (Q3) and the level of grades the students expected (Q2). At the same time, there is a significant difference in the level of expected grades among the different length of stay in the Center ($X^2=11.276$, 4 , $p= 0.024$). Therefore, the median levels of grades are different among the different groups in terms of the length of stay in the Center.
4. However, the frequency of visits per week (Q4) is not significantly related to the level of expected grades (Q2).

Study Results:

1. Descriptive Statistics:

Q2: what grade do you expect for this class this semester?

Q3: On average, how many hours per week did you visit the Success Center?

Q4: On average, how many times per week did you visit the Success Center?

			Statistics		
Q5: In general, do you feel the Success Center has helped to improve your grade?			Q2 Recoded*	Q3 Recode**	Q4 Recode***
Yes	N	Valid	51	51	52
		Missing	1	1	0
		Mean	3.2549	3.2549	1.3077
		Median	4.0000	3.0000	1.0000
		Std. Deviation	.93473	1.14618	.72864
		Minimum	1.00	1.00	1.00
		Maximum	4.00	5.00	4.00
No	N	Valid	18	18	18
		Missing	0	0	0
		Mean	1.7778	2.8333	1.0556
		Median	1.5000	2.0000	1.0000
		Std. Deviation	.94281	1.46528	.23570
		Minimum	1.00	1.00	1.00
		Maximum	4.00	5.00	2.00

Note: * 4.0=A, 3.0=B, 2.0=C, 1.0=Not Passing & Withdraw
** 1.0= Less than 1 hour to 5.0=Longer than 5 hours
*** 1.0=1 to 3, 2.0=4 to 5, 3.0=6 to 7, 4.0=8 or more

From the above table, we can tell that students usually expected higher grades, visited the Center longer hours and more frequently per week when they felt the Success Center has helped to improve their grades (answered “Yes”).

2. Relationship between Q5 “In general, do you feel the Success Center has helped to improve your grade?” and Q2 “what grade do you expect for this class this semester?”

Correlations

			Q5 recoded	Q2 Recoded
Kendall's tau_b	Q5 recoded	Correlation Coefficient	1.000	.511**
		Sig. (2-tailed)	.	.000
		N	70	69
	Q2 Recoded	Correlation Coefficient	.511**	1.000
		Sig. (2-tailed)	.000	.
		N	69	69
Spearman's rho	Q5 recoded	Correlation Coefficient	1.000	.555**
		Sig. (2-tailed)	.	.000
		N	70	69
	Q2 Recoded	Correlation Coefficient	.555**	1.000
		Sig. (2-tailed)	.000	.
		N	69	69

** . Correlation is significant at the 0.01 level (2-tailed).

Two non-parametric correlation tests (Kendall's tau_b and Spearman's rho) was conducted to assess the correlations between *if students feel the Success Center has helped to improve their grades (Q5)* and *the level of grades they expected for their classes (Q2)*. Non-parametric measures of correlations are commonly used to assess the correlations where the variables are not interval level data. In this case, Q5 is nominal level data and Q2 is ordinal level data (Q5 is dichotomous and Q2 the level of expected grades is rank-ordered). Judging by the results, both Kendall's tau_b and Spearman's rho tests show that **there is a positive correlation between feeling the Success Center has helped to improve students' grades (Q5) and the level of grades the students expected (Q2)**. In other words, if students felt the Success Center has helped to improve their grades, they expected higher grades for their classes.

Next, a statistical test was conducted to see if there is a significant difference between the students who felt the Center has helped improve their grades and the ones who felt otherwise in terms of the level of grades they expected Q2. **The Kolmogorov-Smirnov Test results show that there is a significant difference in the level of expected grades between the two groups of students (z=2.193, p= 0.000)**. The median level of grades for the group of students who felt the Success Center has helped them to improve their grades (answered "yes") is 4.0 (equal to A) and the median level of grades for the group of students who felt the Success Center has not helped them to improve their grades (answered "no") is 1.5 (lower than C).

Two-Sample Kolmogorov-Smirnov Test

Test Statistics ^a		Q2 Recoded
Most Extreme Differences	Absolute	.601
	Positive	.000
	Negative	-.601
Kolmogorov-Smirnov Z		2.193
Asymp. Sig. (2-tailed)		.000

a. Grouping Variable: In general, do you feel the Success Center has helped to improve your grade?

3. **Relationship between Q3 “On average, how many hours per week did you visit the Success Center” and Q2 “what grade do you expect for this class this semester”**

Crosstab:

Q3 Recode * Q2 Recoded Crosstabulation

		Q2 Recoded				Total
		1.00	2.00	3.00	4.00	
Q3 Recode Less than 1 hour	Count	1	0	4	2	7
	% within Q3 Recode	14.3%	.0%	57.1%	28.6%	100.0%
	% of Total	1.5%	.0%	5.9%	2.9%	10.3%
Between 1 to 2 hours	Count	6	5	2	2	15
	% within Q3 Recode	40.0%	33.3%	13.3%	13.3%	100.0%
	% of Total	8.8%	7.4%	2.9%	2.9%	22.1%
Between 2 to 3 hours	Count	3	1	5	10	19
	% within Q3 Recode	15.8%	5.3%	26.3%	52.6%	100.0%
	% of Total	4.4%	1.5%	7.4%	14.7%	27.9%
Between 3 to 4 hours	Count	1	2	4	8	15
	% within Q3 Recode	6.7%	13.3%	26.7%	53.3%	100.0%
	% of Total	1.5%	2.9%	5.9%	11.8%	22.1%
Longer than 5 hours	Count	2	2	3	5	12
	% within Q3 Recode	16.7%	16.7%	25.0%	41.7%	100.0%
	% of Total	2.9%	2.9%	4.4%	7.4%	17.6%
Total	Count	13	10	18	27	68
	% within Q3 Recode	19.1%	14.7%	26.5%	39.7%	100.0%
	% of Total	19.1%	14.7%	26.5%	39.7%	100.0%

It seems that students expected higher level of grades when they visited the Success Center for longer hours. For example, half of the students who visited the Center between 2 to 3 hours and between 3 to 4 hours per week expected As (level 4.0).

Kendall's tau_b and Spearman's rho one-tailed tests:

Correlations			Q2 Recoded	Q3 Recode
Kendall's tau_b	Q2 Recoded	Correlation Coefficient	1.000	.174*
		Sig. (1-tailed)	.	.043
		N	69	68
Q3 Recode	Q2 Recoded	Correlation Coefficient	.174*	1.000
		Sig. (1-tailed)	.043	.
		N	68	69
Spearman's rho	Q2 Recoded	Correlation Coefficient	1.000	.218*
		Sig. (1-tailed)	.	.037
		N	69	68
Q3 Recode	Q2 Recoded	Correlation Coefficient	.218*	1.000
		Sig. (1-tailed)	.037	.
		N	68	69

*. Correlation is significant at the 0.05 level (1-tailed).

Judging by the results, both Kendall's tau_b and Spearman's rho one-tailed tests show that **there is a positive correlation between the number of hours per week a student visited the Success Center (Q3) and the level of grades the students expected (Q2)**. In other words, if students visited the Center for longer hours, they expected higher grades for their classes.

Next, a statistical test was conducted to see if there is a significant difference between Q3 the length of stay in the Center in terms of Q2 the level of grades they expected. **The Kruskal-Wallis Test results show that there is a significant difference in the level of expected grades among the different length of stay in the Center ($X^2=11.276, 4, p=0.024$)**. Therefore, the median levels of grades are different among the different groups in terms of the length of stay in the Center.

Kruskal-Wallis Test

Ranks

	Q3 Recode	N	Mean Rank
Q2 Recoded	1.00	7	35.29
	2.00	15	20.63
	3.00	19	39.58
	4.00	15	40.93
	5.00	12	35.29
	Total		68

Test Statistics^{a,b}

	Q2 Recoded
Chi-Square	11.276
df	4
Asymp. Sig.	.024

a. Kruskal Wallis Test

b. Grouping Variable: Q3 Recode

4. Relationship between Q4 “On average, how many times per week did you visit the Success Center” and Q2 “what grade do you expect for this class this semester”

Q4 Recode * Q2 Recoded Crosstabulation

		Q2 Recoded				Total
		1.00	2.00	3.00	4.00	
Q4 Recode	1.00 Count	11	9	16	22	58
	% within Q4 Recode	19.0%	15.5%	27.6%	37.9%	100.0%
	% of Total	15.9%	13.0%	23.2%	31.9%	84.1%
Q4 Recode	2.00 Count	2	1	1	3	7
	% within Q4 Recode	28.6%	14.3%	14.3%	42.9%	100.0%
	% of Total	2.9%	1.4%	1.4%	4.3%	10.1%
Q4 Recode	3.00 Count	0	0	1	1	2
	% within Q4 Recode	.0%	.0%	50.0%	50.0%	100.0%
	% of Total	.0%	.0%	1.4%	1.4%	2.9%
Q4 Recode	4.00 Count	0	0	1	1	2
	% within Q4 Recode	.0%	.0%	50.0%	50.0%	100.0%
	% of Total	.0%	.0%	1.4%	1.4%	2.9%
Total	Count	13	10	19	27	69
	% within Q4 Recode	18.8%	14.5%	27.5%	39.1%	100.0%
	% of Total	18.8%	14.5%	27.5%	39.1%	100.0%

Because the majority of the students visited the Success Center 1 to 3 times per week (84.1%), it is hard to tell the difference between the frequency of visits per week and the level of the grades students expected. Similarly, Kendall’s tau_b and Spearman’s rho one-tailed tests are not significant either. That means the frequency of visits per week is not significantly related to the level of expected grades.

Correlations

			Q4 Recode	Q2 Recoded
Kendall's tau_b	Q4 Recode	Correlation Coefficient	1.000	.057
		Sig. (1-tailed)	.	.301
		N	70	69
Q2 Recoded	Q4 Recode	Correlation Coefficient	.057	1.000
		Sig. (1-tailed)	.301	.
		N	69	69
Spearman's rho	Q4 Recode	Correlation Coefficient	1.000	.064
		Sig. (1-tailed)	.	.299
		N	70	69
Q2 Recoded	Q4 Recode	Correlation Coefficient	.064	1.000
		Sig. (1-tailed)	.299	.
		N	69	69

Math Success Center Survey (MA 127) Comparisons Spring 2009 vs. Fall 2009

Tutoring

--- Spring 2009 total responses: 38 students

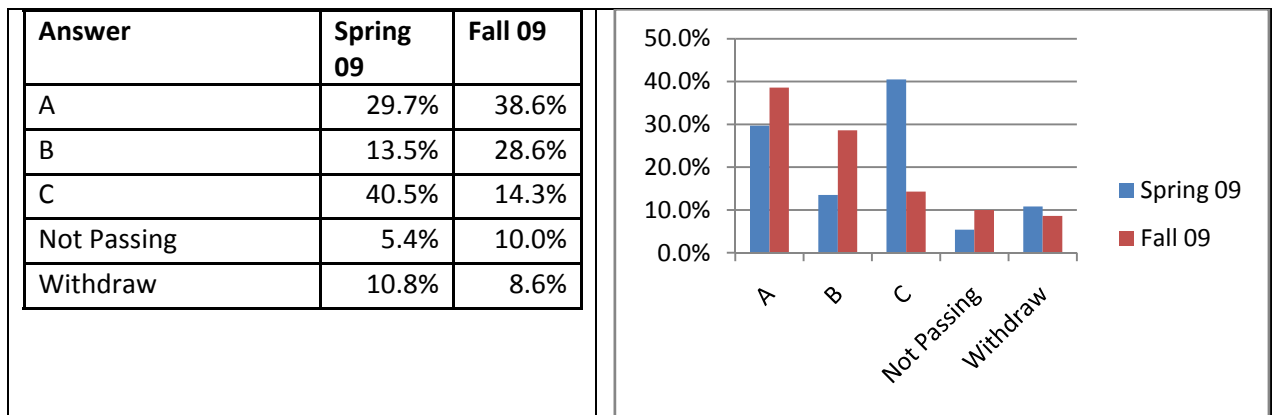
--- Fall 2009 total responses: 70 students

1. If you went to the Success Center for tutoring help, what was the main subject?

Answer	Spring 09	Fall 09
Math	97.4%	98.6%
Physics	0.0%	0.0%
Chemistry	2.6%	0.0%
Biology	0.0%	0.0%
Other	0.0%	1.4%

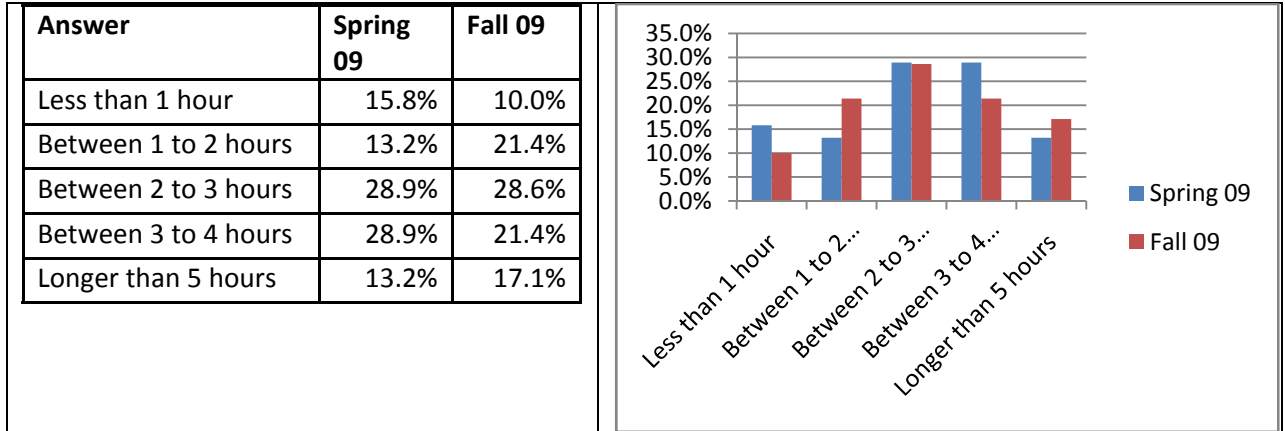
In both semesters, almost all of the students visited the Success Center for Math tutoring help.

2. What grade do you expect for this class this semester?



More students expected As and Bs in Fall 09 compared to Spring 09 while more students expected Cs in Spring 09 compared to Fall 09.

3. On average, how many hours per week did you visit the Success Center?



Students tend to stay in the Center longer per week in Spring 09 than in Fall 09 except “Longer than 5 hours”.

4. On average, how many times per week did you visit the Success Center?

Answer	Spring 09	Fall 09
1 to 3	76.3%	84.3%
4 to 5	21.1%	10.0%
6 to 7	2.6%	2.9%
8 or more	0.0%	2.9%

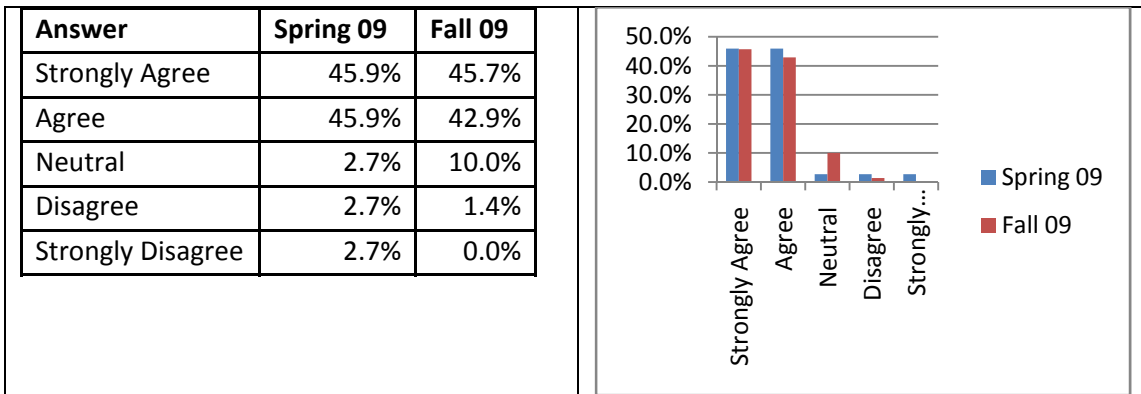
More students visited the Center 4 to 5 times per week in Spring 09 than in Fall 09.

5. In general, do you feel the Success Center has helped to improve your grade?

Answer	Spring 09	Fall 09
Yes	89.5%	74.3%
No	10.5%	25.7%

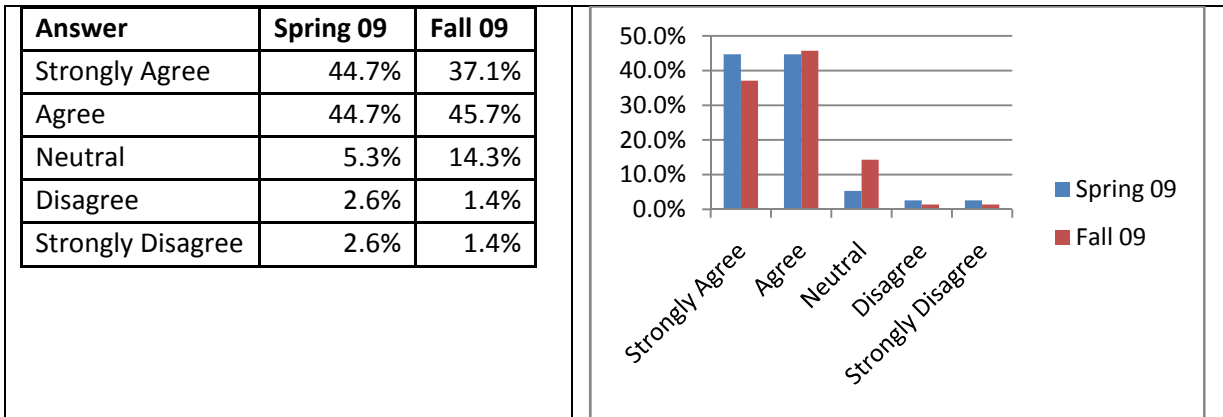
More students felt that the Center has helped to improve their grade in Spring 09 than Fall 09.

6. The tutors are knowledgeable in the subject you asked for help.



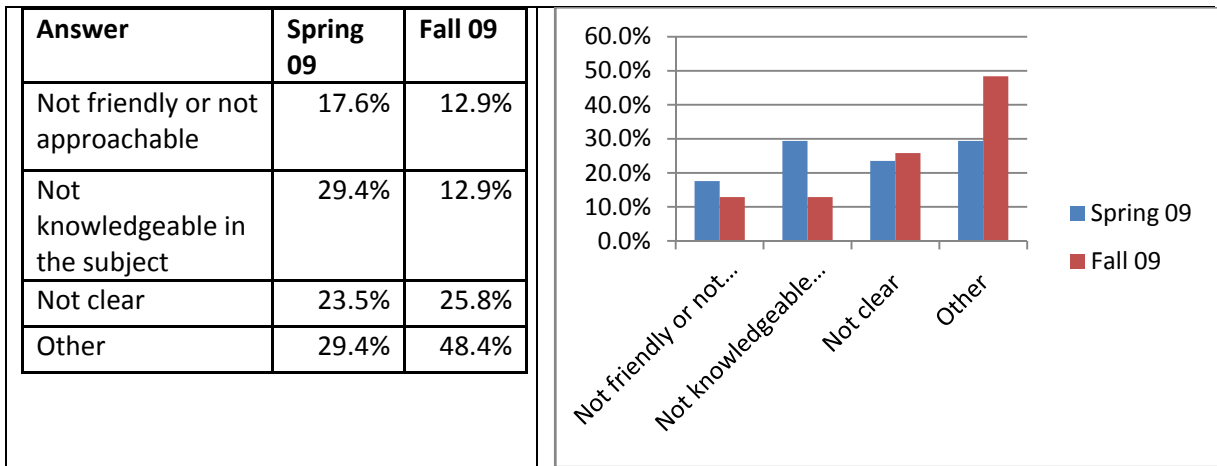
Students' responses for this question follow similar trend in both semesters except more students selected "Neutral" and less "Strongly Disagree" in Fall 09.

7. The tutors are helpful.



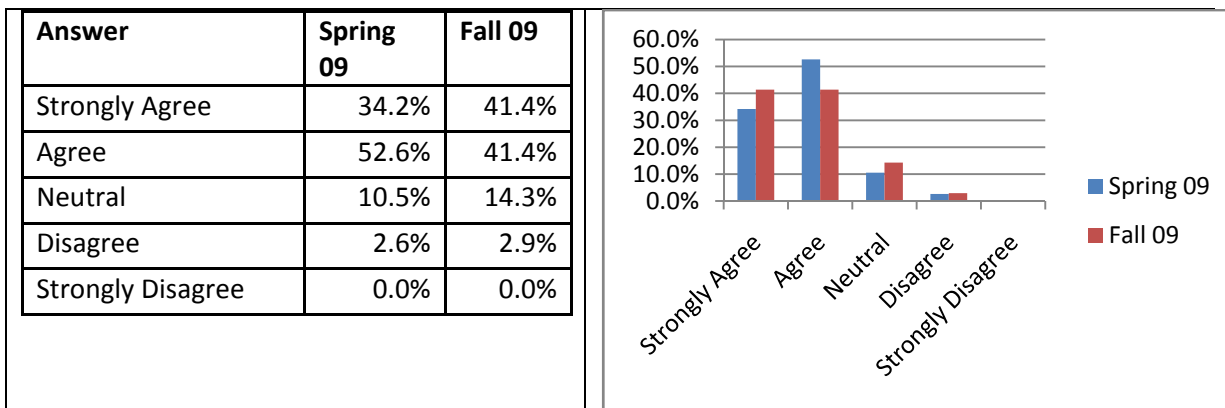
More students selected "Neutral" but less "Strongly Agree" in Fall 09 than in Spring 09.

8. If the tutors were not helpful, what was the reason?



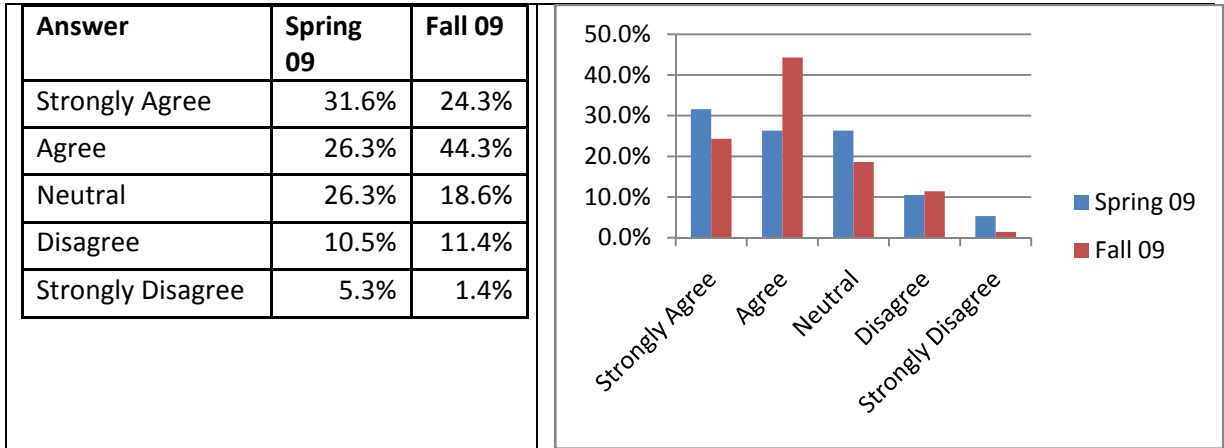
There is a higher percentage of students selected “Other” for this question in Fall 09 than in Spring 09. This issue can be better understood by checking students’ responses for the open-ended question at the end.

9. The front desk staff is friendly.



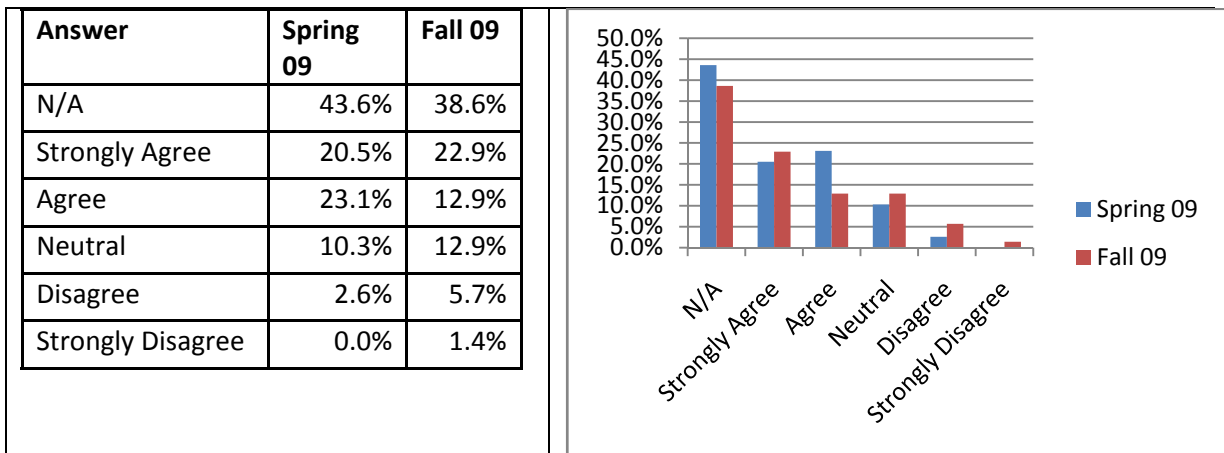
Students’ responses follow similar trend in both semesters except more students selected “Agree” in Spring 09.

10. Tutors were available when you asked for help.



A higher percentage of students selected “Agree” for this question in Fall 09 than in Spring 09.

11. The textbooks were available when you requested them.



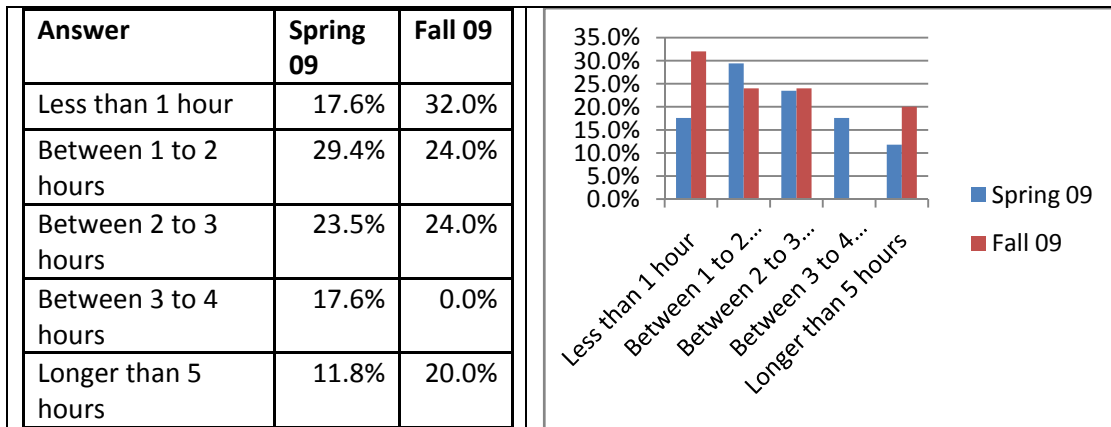
A slightly higher percentage of respondents selected “Disagree” or “Strongly Disagree” for this question in Fall 09.

Independent Study

--- Spring 2009 total responses: 17 students

--- Fall 2009 total responses: 25 students

1. On average, how many hours per week did you visit the Success Center?



Different trends are shown for this question in the two semesters. A higher percentage of respondents visited the Center either Less than 1 hour or Longer than 5 hours in Fall 09 compared to Spring 09 and a higher percentage of respondents visited the Center either Between 1 to 2 hours or Between 3 to 4 hours in Spring 09 compared to Fall 09.

2. On average, how many times per week did you visit the Success Center?

Answer	Spring 09	Fall 09
1 to 3	88.2%	88.0%
4 to 5	0.0%	8.0%
6 to 7	0.0%	0.0%
8 or more	11.8%	4.0%

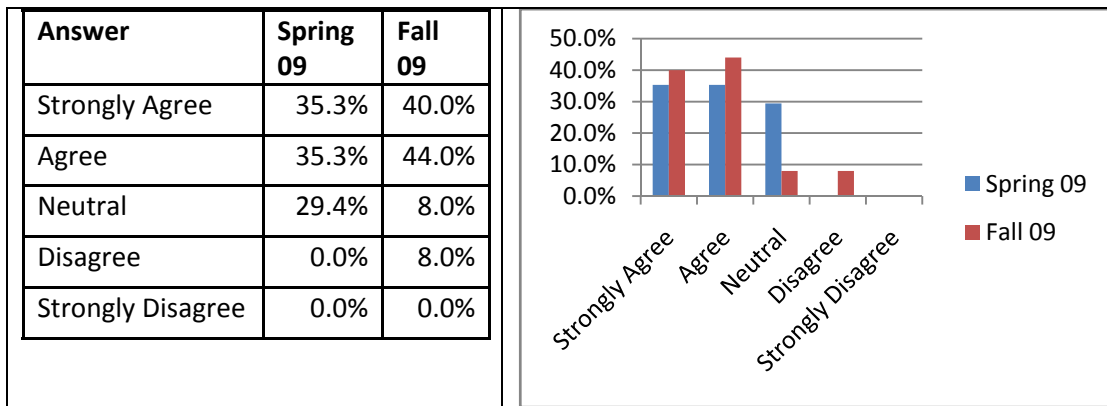
Students' responses follow similar trends in both semesters with the majority of them visited the Center 1 to 3 times per week.

3. In general, do you feel the Success Center has helped to improve your grade?

Answer	Spring 09	Fall 09
Yes	88.2%	88.0%
No	11.8%	12.0%

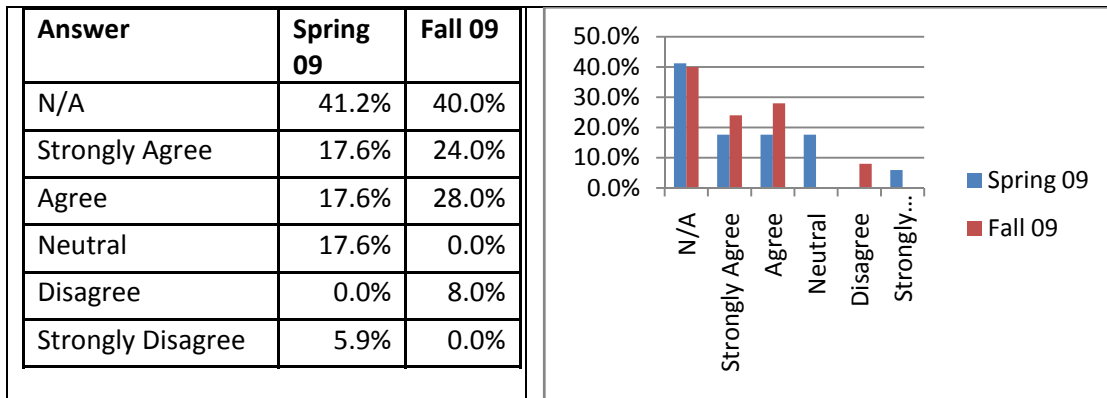
The responses for this question are almost exactly the same.

4. The front desk staff is friendly.



A higher percentage of respondents selected either “Strongly Agree” or “Agree” in Fall 09 compared to Spring 09 for this question. However, while no one selected Disagree in spring 09, there is also an 8.0% of the respondents selected Disagree in Fall 09.

5. The textbooks were available when you requested them.



The patterns of responses are different in the two semesters with more students either “Strongly Agree” or “Agree” that the textbooks were available and no one “Strongly Disagree” that the textbooks were available in Fall 09 compared to Spring 09.

MA 127 Math Success Center Usage Report Winter, Spring, Fall 2009

Table 1. Aggregated Usage Frequency Table for Math Success Center in Winter 09, Spring 09, and Fall 09 Semesters

	Average/Mean	Median	Minimum	Maximum
Winter 09 (Jan 20 th – Feb 12 th)	2 hrs + 57 mins	1 hr + 35 mins	2 min	18 hrs + 13 mins
Spring 09 (Feb 23 rd – June 2 nd)	7 hrs + 52 mins	2 hrs + 38 mins	1 min	132 hrs + 22 mins
Fall 09 (Aug 28 th – Dec 19 th)	7 hrs + 55 mins	3 hrs + 10 mins	1 min	136 hrs + 28 mins

Table 2. Aggregated Usage Breakouts for Math Success Center in Winter 09, Spring 09, and Fall 09 Semesters

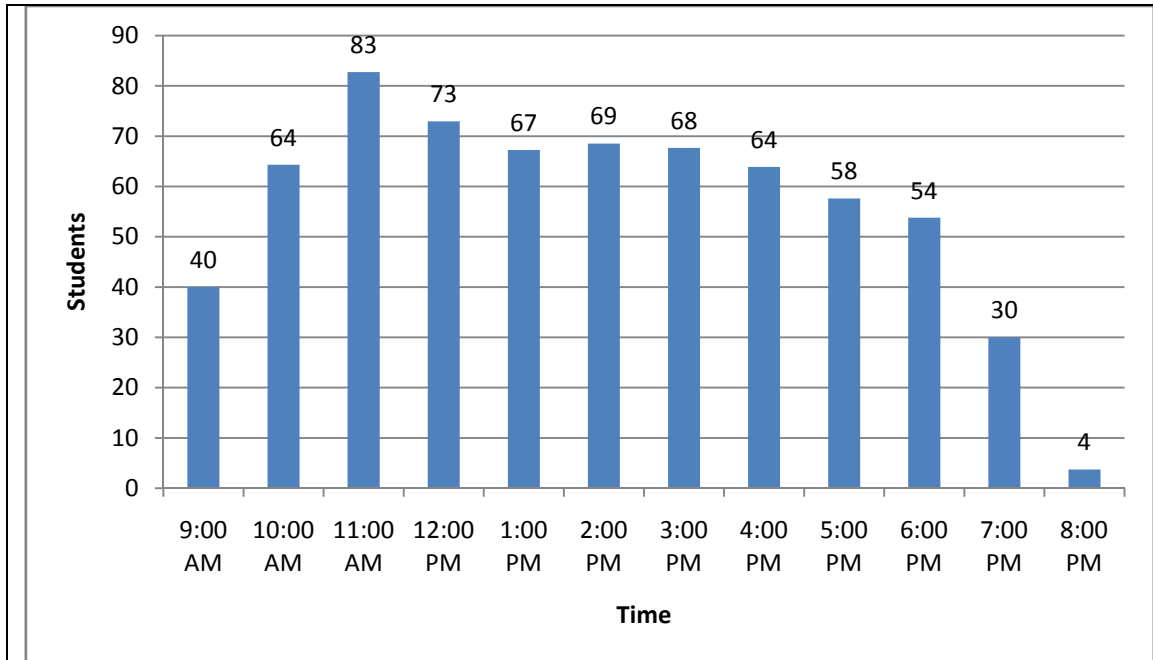
	< 1 hour	1 to 3 hrs	3 to 6 hrs	6 to 10 hrs	10 to 20 hrs	20 to 40 hrs	40 to 80 hrs	80+ hrs	Total Students
Winter 09 (Jan 20 th – Feb 12 th)	37 (31.1%)	47 (39.5%)	19 (16.0%)	10 (8.4%)	6 (5.0%)	0	0	0	119
Spring 09 (Feb 23 rd – June 2 nd)	166 (24.0%)	199 (28.7%)	110 (15.9%)	60 (8.7%)	90 (13.0%)	43 (6.2%)	21 (3.0%)	4 (0.6%)	693
Fall 09 (Aug 28 th – Dec 19 th)	153 (21.5%)	190 (26.7%)	117 (16.4%)	87 (12.2%)	98 (13.8%)	42 (5.9%)	22 (3.1%)	3 (0.4%)	712

Notes:

1. In Winter 09 semester, there are 2.8% usages in which students did not log out (N=10 out of 353). Thus, the minutes of these usages were replaced by the median of all the usages (minutes=48).
2. In Spring 09 semester, there are 2.4% usages in which students did not log out (N=101 out of 4,165). Thus, the minutes of these usages were replaced by the median of all the usages (minutes=62).
3. In Fall 09 semester, there are 4.9% usages in which students did not log out (N=211 out of 4,309). Thus, the minutes of these usages were replaced by the median of all the usages (minutes=61).
4. There are 6 weeks in Winter 09 semester, 16 weeks in Spring 09 semester, and 16 weeks in Fall 09 semester.

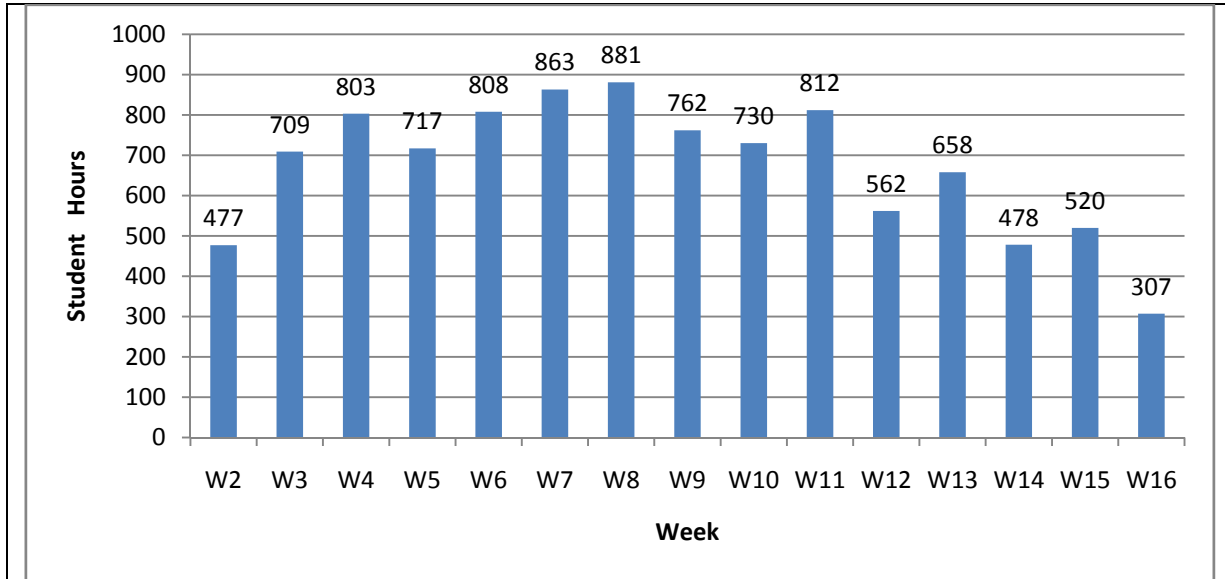
Weekly Hourly Comparisons

Figure 1. Average Number of Students Visited Math Success Center by hour during A Week in Spring 2009 Semester



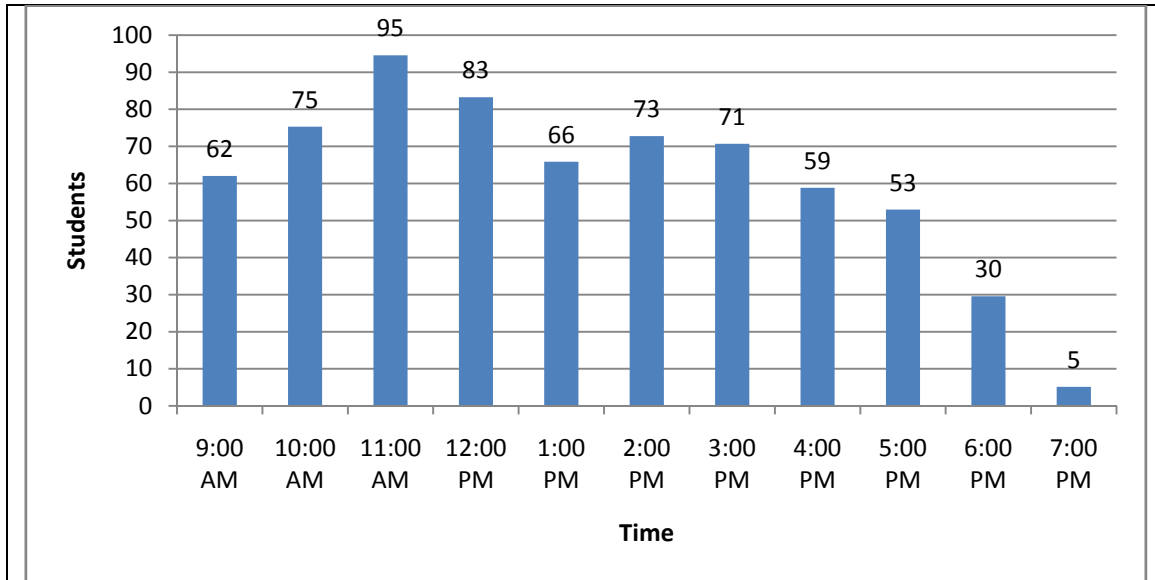
This chart shows that averagely the highest number of students visited the Math Success Center by hour during a week was at 11:00 am (averagely there were 83 students in the Center between 11:00 am and 12:00 pm), and then at 12:00 pm, 2:00 pm, 3:00 pm, and 1:00 pm.

Figure 2. Student Hours at Math Success Center by Week in Spring 2009 Semester



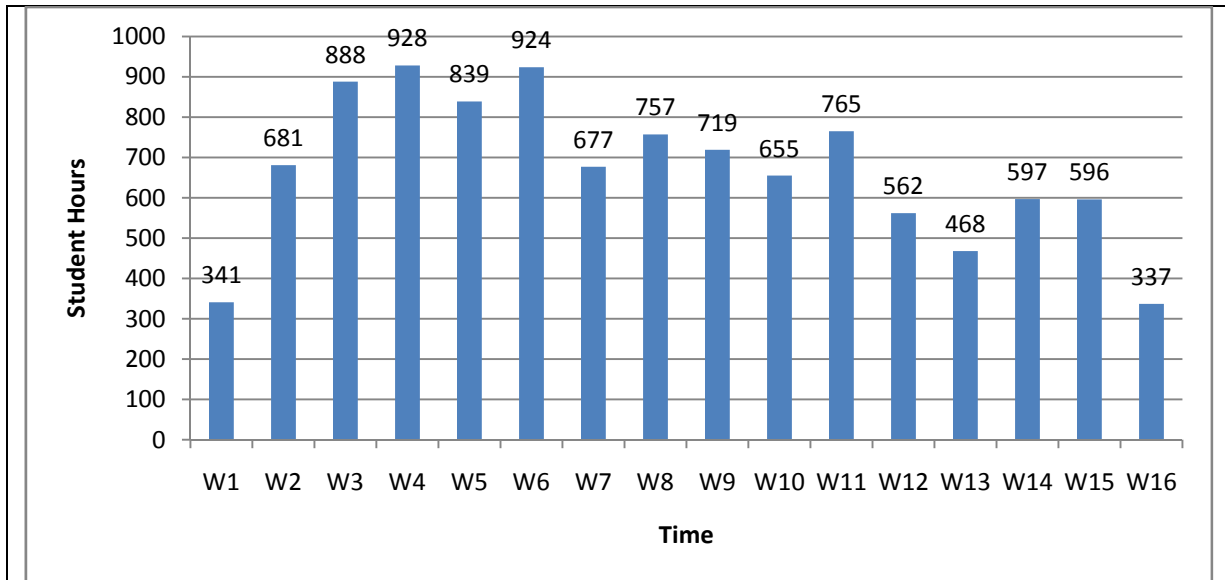
This chart shows that the highest number of student visits during the Spring 2009 semester happened in Week 8 (881 student hours were recorded for that week). Please note that student hour refers to every hour that the student stayed in the Math Success Center. For example, if a student stayed in the Center from 9:15 am to 11:30 am. His or her visit was counted as three student hours: 9:00 am, 10:00 am, and 11:00 am. Then Week 7, Week 11, Week 6, & Week 4 were busy as well.

Figure 3. Average Number of Students Visited Math Success Center by hour during A Week in Fall 2009 Semester



This chart shows that averagely the highest number of students visited the Math Success Center by hour during a week was at 11:00 am (averagely there were 95 students in the Center between 11:00 am and 12:00 pm), and then at 12:00 pm, 10:00 am, 2:00 pm, and 3:00 pm.

Figure 4. Student Hours at Math Success Center by Week in Fall 2009 Semester



This chart shows that the highest number of student visits during the Fall 2009 semester happened in Week 4 (928 student hours were recorded for that week) and in Week 6 (924 student hours were recorded for that week). Please note that student hour refers to every hour that the student stayed in the Math Success Center. For example, if a student stayed in the Center from 9:15 am to 11:30 am. His or her visit was counted as three student hours: 9:00 am, 10:00 am, and 11:00 am. Then Week 3 and Week 5 were busy as well.

MA 130 STEM Success Center Usage Report Fall 2009

Table 1. Aggregated Usage Frequency Table for STEM Success Center in Fall 09 Semester

	Average/Mean	Median	Minimum	Maximum
Fall 09 (Aug 28th – Dec 19th)	7 hrs + 30 mins	2 hrs + 45 mins	1 min	83 hrs + 24 mins

Table 2. Aggregated Usage Breakouts for STEM Success Center in Fall 09 Semester

	< 1 hour	1 to 3 hrs	3 to 6 hrs	6 to 10 hrs	10 to 20 hrs	20 to 40 hrs	40 to 80 hrs	80+ hrs	Total Students
Fall 09 (Aug 28th – Dec 19th)	155 (19.1%)	265 (32.7%)	118 (14.5%)	75 (9.2%)	114 (14.1%)	64 (7.9%)	19 (2.3%)	1 (0.1%)	811

Notes:

1. In Fall 09 semester, there are 4.4% usages in which students did not log out (N=246 out of 5,565). Thus, the minutes of these usages were replaced by the median of all the usages (minutes=60).
2. In CI-Tracker, LocationID is MA130 and CategoryName is STEM Success Center, General_Course_work, and Math Success Center Tutoring.

Math 151 Peer Mentoring Program Data Analysis Results

1. Descriptive Data analysis

- Final Grade Comparisons

The course success rates (the combination of A, B, and C) are higher for Peer Mentoring Program mentees (84.2%) than non-mentees (59.3%). A higher percentage of mentees achieved A or B than non-mentees as well.

	A	B	C	A, B, & C Combined	D	F	FW	W	Total
Non-Mentees	16.0% (24)	25.3% (38)	18.0% (27)	59.3% (89)	14.0% (21)	12.7% (19)	2.0% (3)	12.0% (18)	100% (150)
Mentees	36.8% (7)	31.6% (6)	15.8% (3)	84.2% (16)	5.3% (1)	5.3% (1)	0.0% (0)	5.3% (1)	100% (19)
Combined	18.3% (31)	26.0% (44)	17.8% (30)	62.1% (105)	13.0% (22)	11.8% (20)	1.8% (3)	11.2% (19)	100% (169)

2. Chi-square:

A Chi-square test was conducted to see if there is a significant relationship between *Participating in Peer Mentoring Program* and *Passing the Course* (the combination of A, B, and Cs). Based on the Chi-square test results ($X^2=4.436$, $df=1$, $p=0.035$), we can conclude that *Participating in Peer Mentoring program* and *Passing the Course* is significantly related.

Chi-Square Tests

	Value	df	Asymp. Sig. (2- sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.436 ^a	1	.035		
Continuity Correction ^b	3.441	1	.064		
Likelihood Ratio	4.976	1	.026		
Fisher's Exact Test				.044	.028
Linear-by-Linear Association	4.409	1	.036		
N of Valid Cases	169				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.20.

b. Computed only for a 2x2 table

In conclusion, the descriptive data analysis results show that the course success rates for Peer Mentoring Program mentees are higher than non-mentees. *Participating in Peer Mentoring program* and *Passing the Course* are significantly related as well ($X^2=4.436$, $df=1$, $p=0.035$).