The Undergraduate Workload at Carnegie Mellon University
vs.
The Undergraduate Workload at other Universities in the United States

Introduction

According to the weekly Carnegie Mellon University (CMU) student newspaper, *The Tartan*, there is a belief that Carnegie Mellon students are overworked relative to their peers in other colleges.[1] However, there are some that deny the validity of these perceptions. For example, a psychology professor in the CMU psychology department sited a survey conducted in February 1999 by the Center for Innovation in Learning, in which 70 Carnegie Mellon first-years and juniors were asked how they spent their time. Surprisingly, he said, researchers found that students' academic work, including classes, took up less than recreation, and that on average, students participating in the survey got about 8.5 hours of sleep per night.

Our survey sets out to assess whether this statement and the results of this survey are true based on student's responses about their estimated workload and comparing that against national surveys and statistics that have been done. Furthermore, we have attempted to survey students' thoughts on whether based on their belief of expected compensation after graduation (ie. job outlook, average starting salary, etc), they believe that the workload is worth the time. We asked CMU students how much time they spend studying for their classes on average per week. We then compared the results to the national average as determined by several national surveys.

The Bureau of Labor Statistics surveyed the time use on an average weekday for full-time university and college students between 2003 and 2006. The survey determined that on average, a college student spends 3.2 hours studying[2]. The 2007 National Survey of Student Engagement (NSSE) found that the average student spent 13 to 14 hours studying per week[3], which was unchanged from the 2004 NSSE survey[4]. Harris Interactive's "360 College Explorer Outlook Study" in 2002 found that "Students spend 1.7 hours in class per day, on average, and another 1.6 hours studying"[5].

After fully assessing our responses and results, we hope to determine whether or not CMU students spend more time studying than the national average, and if they are overworked, whether they see it paying off in the long run. We plan to present our results to the student population at CMU through the Tartan, either dispelling or validating the myth that CMU students work harder than the average college student. If the results show that CMU students are overworked and they do not feel it pays off in the long run, we hope our results will force college deans to take a second look at how curriculums are structured.

The results of our survey show that Carnegie Mellon undergraduate students claim to spend considerably more time on school work and in-class than the national average. In our survey, CMU students reported working an average of 26 hours per week (not including in-class time), versus

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[1] Dave, Akshay. "Are we working too hard?" *The Tartan*. Volume 102, Issue 9. October 29, 2007.
[2] Bureau of Labor Statistics. http://www.bls.gov/tus/charts/ch6.pdf
[3] National Survey of Student Engagement, 2007 Annual Report: Experiences That Matter: Enhancing Student Learning and Success. http://nsse.iub.edu/NSSE_2007_Annual_Report/
[4] National Survey of Student Engagement, 2007 Annual Report: Student Engagement: Pathways to Collegiate Success. http://nsse.iub.edu/html/report-2004.cfm
[5] Harris Interactive. Beyond Spring Break: What College Students Do with the Rest of Their Leisure Time. http://findarticles.com/p/articles/mi_m4021/is_2002_Nov_1/ai_93089474

weekly averages in the 13-14 hour range from the studies quoted above. Our results also show that Carnegie Mellon students feel that they work harder than students at other universities. Interestingly enough, although perhaps not surprising to the CMU student population, the results of our study support the general perception of Carnegie Mellon being a very rigorous university.

Methods

The population that we sampled were currently enrolled full-time undergraduate students from all colleges at Carnegie Mellon University. Our sampling frame was all undergraduate Carnegie Mellon students listed in the C-Book with available email addresses through the Carnegie Mellon Directory (an undergraduate student email directory). This is different from the population because we are not certain of the methodology that is used to compile the C-Book directory (ie. how it treats transfer students, study abroad students, and part-time students) so potentially our sampling frame is smaller than our total population.

We confirmed a person's student status using the online CMU student directory. Utilizing the "C-Book" directory, we selected participants using a simple random process. To ensure a pure random process, we used a computer-based random number generator to generate two numbers at a time (one for page number and one for person on the page) to ensure that everyone has the same chance of being selected. Instead of consisting of one sample size of 226, our C-Book sampling pool consisted of separate samples for each class, so as to reflect the stratified sample sizes.

After gathering a list of names for our sample and looking up their emails through the CMU directory, an initial email was sent out to the student asking them to take our survey and mention any incentives we might have (ie. raffle prizes, if funds are available). We utilized a web-based survey through www.questionpro.com; participants of this study were sent an email with the link to the survey and instructions. See Appendix 2 for the text of communications we sent to students; Appendix 1 has the full questionnaire we used.

We chose an online survey as it allows students to quickly and conveniently respond whenever and wherever they choose. This also allowed for confidentiality which we hoped boosted our response rate and accuracy in this survey. A paper survey would have been hard to distribute and collect from students (especially using a simple random process). A phone survey would also not have been very successful in reaching the target population because many students primarily use cell phones instead of landline phones. Given our limited financial means and limited manpower, an online survey maximized our exposure to the undergraduate student population at CMU.

We designed a stratified random sample using classes as strata (Freshmen, Sophomore, Junior, Senior, and "Other," which is comprised of Fifth-year students) because we believe that while there is variation between the amount of work and studying done between different colleges at CMU, there is much more variation between the classes themselves. It is a fair assumption to say that the mean of hours spent working and studying over freshman year is different than the amount spent studying senior year, for example. Since we utilized a web-based survey, we assumed around a 25 percent response rate. Also we utilized the C-Book as our sampling frame with a random page and random location method and used the population of Carnegie Mellon undergraduates, which is

5,580, with the stratification as follows:

Stratum (*h*)	N_h	$S^2_{h,pop}$
1 (Freshmen)	1479	144
2 (Sophomore)	1426	100
3 (Junior)	1291	81
4 (Senior)	1172	225
5 (Other)	212	100

The variances of the strata are estimates that we made that seemed plausible. For example, we expect to see a much larger variation in the amount of work done by seniors since some will work much less after they receive a job offer while others will stay focused on academics. Also, sophomore and junior year show less variability because everyone is in the same situation of pursuing their major and looking for internships, so we expect less variation. For example, we expect the standard deviation of juniors to be 9 hours/week and 15 hours/week for seniors.

Sample Size Calculation: $s^2_{pop} = \frac{(1479*144)+(1426*100)+(1291*81)+(1172*225)+(212*100)}{5580}$

≈ 133.52

SD = $\sqrt{133.52} \approx 11.55$

We chose margin of error to be three hours for reasonable accuracy:

$n_0 \geq (1.96)^2(11.55)^2/(3)^2$
$n_0 \geq 56.99$ ➔ (5580*56.99)/(5580+56.99) = 56.42 (after FPC correction)

With the assumption of 25 percent response rate: 56.42/.25 ~ 225.7. This was a reasonable minimum sample size to try to contact utilizing our method of web-based surveying. Appendix 5 on page 15 shows sample size calculations.

For our survey, we contacted 231 Carnegie Mellon undergraduates consisting of 65 Freshmen, 46 Sophomores, 32 Juniors, 78 Seniors and 10 Fifth Years. Of the 231 students contacted, 92 students responded consisting of 33 Freshmen, 25 Sophomores, 15 Juniors, 16 Seniors and 3 Fifth Years. Our response rates for Freshmen, Sophomores and Juniors are near 50%, while our response rate for Seniors and Fifth Years are 20% and 30%, respectively.

While our follow-up survey was effective, providing an additional 24 responses, senior and fifth year response rates remained low. Some reasons for the low response rate could be that students so close to graduation may become apathetic towards participating in CMU surveys or students have been incorrectly labeled as a senior or fifth year. The latter reason is supported by the 11 survey participants who responded "No" to our initial filtering question, these participants may have already graduated or may now be graduate students. Another factor that needs to be considered is

that students who spend a considerable amount of time on school work and in-class may not have had spare time to complete the survey.

The independent variables we wanted to measure are what class, college, and year the student belongs to, and we measured number of courses, average studying time. We are also in the process of determining whether students think they are compensated for their workload after college as dependent variables. We included a question in our survey asking whether this semester is representative of their past semesters to attempt to account for unusual circumstances (ie. a very rigorous course load).

In our survey we included:

- 10 Demographic based questions
- 9 Free-Response questions
    - Number of courses
    - Hours per day, Hours per week
- 8 Likert Scale questions
- Optional question
    - enter your Andrew ID to participate in raffle

Some sample questions from our survey included, but were not limited to*:

- An initial filtering question:
    - *Are you a current CMU full-time (36 units or more) undergraduate student on the Pittsburgh Campus?*

- A stratum designating question:
    - *What is your year in college?*

- How many units are you taking this semester?

- Based on your previous semesters, rate the rigor of this semester's workload. (i.e. difficulty of material, assignments, exams. How much time is necessary to receive desired grade?). Circle one below.

5	4	3	2	1
Significantly more rigorous	**More rigorous**	**Same**	**Less rigorous**	**Significantly less rigorous**

- Are you involved in extracurricular activities (e.g. sports, clubs, job, etc.)? Yes / No

- How satisfied are you with your current QPA?

5	4	3	2	1
Very Satisfied		**Satisfied**		**Not Satisfied at all**

Post Survey Processing

After compiling all of the results (for details of the results, please refer to Appendix 6), we sifted through the responses for each question. We deleted those respondents who only answered a very small percentage of the questions and whose answers could not be counted as plausible. Furthermore, we calculated the total number of respondents that could be deleted (if need be) depending on the response rate and sample size needed in order to guarantee a 25% response rate. Because we stratified by class, the case-wise deletion was examined by our five strata. We found the following:

Class	Sample Size Needed	Sample Size Attained	Maximum Deletions	Actual Deletions
Freshmen	16	32	16	3
Sophomores	11	25	14	0
Juniors	8	14	6	3
Seniors	20	16	0	0
Fifth Years	2	3	1	0

Respondents that did not respond to over half the substantive questions or did not answer the four main survey questions (eg. how many hours on average do you spend studying?) that allow us to do validity checks were deleted through case wise deletion. Six respondents were deleted through this process (3 from the Junior Strata, 3 from the Freshmen Strata). Eleven respondents were ineligible since they answered "no" to our filtering question of are you a current fulltime student at Carnegie Mellon. Four more people were removed from our sample since they did not even start the survey. In two of these four respondents, they actually redid the survey again completely (using IP address and time as a check).

Imputation

Only one value had to be imputed, and we used the hot deck imputation method. We sorted data by college, year, number of classes, in that order.

Question Removal

While going through the imputation method, there were three questions that had close to or over 50% item non-response. These questions are outlined in detail in the tables below:

Question 23 – *How does the workload (i.e. homework, exams, projects, etc.) at CMU compare to what you initially expected college to be like?*

There were a total of 46 non-respondents to this question. These results are also outlined by class year and college:

Year	Number of Non-Response	Percentages
Freshmen	15	32.6%
Sophomores	13	28.3%
Juniors	7	15.2%
Seniors	10	21.7%
5th Years	1	2.2%

College	Number of Non-Response	Percentages
CIT	14	30.4%
SCS	9	19.6%
MCS	8	17.4%
CFA	5	10.9%
HSS	6	13.0%
TSB	4	8.7%

Question 26 – *To what extent does involvement in extracurricular activities (e.g. sports, clubs, jobs, etc.) affect your study time?*

There were a total of 39 non-respondents to this question. These results are also outlined by class year and college:

Year	Number of Non-Response	Percentages
Freshmen	17	43.6%
Sophomores	9	23.1%
Juniors	3	7.7%
Seniors	10	25.6%
5th Years	0	0.0%

College	Number of Non-Response	Percentages
CIT	18	46.2%
SCS	4	10.3%
MCS	4	10.3%
CFA	1	2.6%
HSS	9	23.1%
TSB	3	7.7%

Question 27 – *How satisfied are you with your current QPA?*

There were a total of 40 non-respondents to this question. These results are also outlined by class year and college:

College	Number of Non-Response	Percentages
CIT	17	42.5%
SCS	5	12.5%
MCS	6	15.0%
CFA	4	10.0%
HSS	5	12.5%
TSB	2	5.0%
Interdisciplinary	1	2.5%

Year	Number of Non-Response	Percentages
Freshmen	14	35.0%
Sophomores	12	30.0%
Juniors	8	20.0%
Seniors	6	15.0%
5th Years	0	0.0%

There are some interesting points to note from the results of these three questions. Many people who answered 'Yes' to being involved in extracurricular activities failed to answer the question related to the extent that extracurricular activities affect their study time. On a similar note, there was very little item non-response for the question asking for current QPA (question 28). However, there was over 50% item non-response for when we asked how satisfied people are with their current QPA (question 27).

For question 27, 14 freshmen did not respond. Of those, 5 responded to question 28 asking for their specific QPA as "not satisfied with their QPA." Three claimed to be "very satisfied" while 8 left the following question (28) blank. Also noteworthy is the fact that 11 students from CIT, 3 SCS students, and 2 students from H&SS did not respond to this question. As for sophomores, 12 people did not respond to question 27. Of those, 75% left the next question blank. Juniors on the other hand had fewer non-responses, and of the 8 who did not respond, only one responded to the next question about satisfaction with current QPAs and claimed to be "satisfied." Finally, the senior class had 6 non-respondents, and 66% of them reported to be "satisfied" with their QPA.

Checking & Fixing for Validity

To ensure the validity and feasibility of the data, we took the five quantitative questions we asked which were:

- On average, how many hours a week do you spend studying for class (i.e. reading, studying, doing homework, etc)?
- On average, how many hours per day do you sleep?
- On average, how many hours per week do you spend on physical exercise (jogging, working out, etc.)?
- On average, how many hours per day do you spend relaxing (napping, watching TV, listening to music, eating, etc.) and/or socializing?

- On average, how many hours per day do you spend in class?

and used the following checks:

- Studying/week + 7*(sleep/day) + exercise/week + 7*(relaxing/day) + 7*(class time/day) < 168 (max possible hours in a week)
- Whether responses were greater than 12 for the questions related to questions that asked on a per day basis

Based on using the checks mentioned above, there were several respondents that gave extremely high values for questions asking how much time is spent on activities per day. These values were greater than 12 which indicated that it was highly probable that the respondent based his response on answering the first two questions; assuming that all questions were asking for estimates per week and therefore continued to give answers on a per week basis. This seemed to be a very reasonable assumption.

For the question "how many hours per day do you spend in class," we divided that number by 5 (max school days in a week). The other infeasible values for the other questions were divided by 7 since these questions ask about activities that do not have to occur on a school day. After applying this fix, the values fit within the general range that other respondents gave.

Another trend we noticed was that those who responded with high values usually had high values in all the questions, which further solidified our belief that respondents misread the question. There were 10 data points where we had to make these adjustments.

Weighting

Weighting was determined by computing the weights by class and then computing the weights by college. We then took the product of the two to get the final weight used for each data point. The reason we chose a weight that was the product of college and class was that we compared the standard deviation between the population and sample proportions using only the class weights and then using both weights and saw that the standard deviation was lower for the second option. The population demographics were retrieved from the Carnegie Mellon Common Data Set. These results can be seen in the table below:

College	Population Proportion	Sample Proportion (weighing by class)	Sample Proportion (weighing by class & college)
CFA	0.16803503	0.128227187	0.16434358
CIT	0.282430213	0.351204535	0.277405777
HSS	0.193577814	0.1486465	0.201184496
Inter	0.044517424	0.020284821	0.037882331
MCS	0.128443715	0.106874287	0.127564607
SCS	0.100893997	0.131240283	0.108812825
Tepper	0.082101806	0.113522387	0.082806384
Class			
Fresh	0.258596735	0.258596735	0.234367
Soph	0.253560264	0.253560264	0.25216
Junior	0.234282737	0.234282737	0.212318
Senior	0.220389024	0.220389024	0.234079
Fifth	0.03317124	0.03317124	0.037076
	Standard Deviation	0.090766305	**0.083771155**

To ensure proper representation, we calculated the new weighted sample demographics by conducting Taylor Series by college because we find less variation than by year. Weighting the results by college will give us a more accurate view of how each college perceives workload. This will then allow us to see if different classes within a certain college feel like the workload is either easier or harder given their class status. We then compared these sample weights against the population demographics. The results are as follows:

Column1	Column2	Column3	Column4	Column5	Column6
	Weighted Sample Demographics			**Population Demographics**	
Gender	**Respondents**	**%**		**Respondents**	**%**
Female	42.502	49.60%		3500	60.78%
Male	43.104	50.40%		2258	39.22%
Class					
Freshmen	21.758	25.40%		1489	25.86%
Sophomore	23.712	27.70%		1460	25.36%
Junior	17.854	20.90%		1349	23.43%
Senior	19.163	22.40%		1269	22.04%
Fifth	3.118	3.60%		191	3.32%
College					
Carnegie Institute of Technology (CIT)	25.379	16.13%		921	16.80%
College of Fine Arts (CFA)	13.808	29.65%		1548	28.24%
Humanities and Social Sciences (H&SS)	16.917	19.76%		1061	19.36%
Interdisciplinary or Other (Specify)	3.186	3.72%		244	4.45%
Mellon College of Science (MCS)	10.205	11.92%		704	12.84%
School of Computer Science (SCS)	9.150	10.69%		553	10.09%
Tepper School of Business (TSB)	6.961	8.13%		450	8.21%
Ethnicity					
African	5.877	6.87%		288	5.02%
Asian	23.4407	27.38%		1380	24.07%
Hispanic	6.97	8.14%		265	4.62%
White	46.48725	54.30%		694	12.11%
Other	2.831	3.31%		2285	39.86%

These are the actual weights we used.

Class * College Weights					
	Fresh	Soph	Junior	Senior	5th
Fresh/CFA	0.995475832	1.093218	2.104383	1.48469	1.191808
Fresh/CIT	0.613498461	0.673736	1.296903	0.914994	0.734495
Fresh/HSS	1.051230405	1.154447	2.222245	1.567844	1.258558
Fresh/Inter	1.450519617	1.592941	3.066321	2.163359	1.736597
Fresh/MCS	0.837021156	0.919206	1.263544	1.769418	1.002102
Fresh/SCS	0.597717845	0.656406	1.413775	1.248364	0.715602
Fresh/Tepper	0.668784659	0.73445	0.99745	0.891459	0.800685

Results

The primary research question which our study sought to answer was about the academic rigor of Carnegie Mellon University and, specifically, whether undergraduate students are overworked relative to their peers in other universities. To address our primary research question, we calculated the weighted average responses to such questions as, "how many hours a week do you spend studying for class?" and "how many hours per day do you spend in class?" Our study was conducted under the null hypothesis that students are in fact overworked relative to other universities, in order to reflect this widely-held belief of CMU students. In order to test this "null hypothesis" we focused on a few key questions in our survey. Specifically, we cared about the following:

- Average number of hours per week that students studied for class
- Average number of hours per day that students spent in class
- Average number of hours of sleep per night that students reported
- Average number of hours of recreation per day that students reported

The data gathered from the above four types of questions were of the utmost importance in creating a holistic and rather informative picture of the individual, by focusing not only on the time spent in school or on academic work, but also the time *not* spent doing academic or work-related activities. As a result, we will discuss the results from these four types of questions and how they compared with national averages. So what did we learn from our results?

Regarding the number of hours per week that students spent studying for a class, the weighted average came out to be 26.8 hours for Carnegie Mellon students. According to the National Survey for Student Engagement, the average college student spent 13-14 hours per week studying. Therefore, Carnegie Mellon students, on average, tend to study nearly twice as much as college students nationwide. Although this metric is particularly salient in addressing our research question, it is important to note that the act of studying is essentially a voluntary one, and as such it is more reflective of the student, rather than the university workload itself. As a result, we also found it useful to look at the average number of hours that students spent in class, which is both a reflection of the student in terms of scheduling, but also of the university. We found that on average, CMU students spent 5.54 hours per day in class. According to NSSE, the average college student spent 1.7 hours in class per day. So, this is another metric in which Carnegie Mellon students over-perform relative to their peers.

In terms of leisurely activities, researchers found that the average college student's academic work (including classes) took up less time than recreation. On average, CMU students spent roughly 5.1 hours per day on recreational (non-academic) activities. Since CMU students spent an average of 5.54 hours per day in class, the time spent on academics still exceeds the time spent on recreation, which contrasts the national statistics. Finally, with regard to sleep, students who participated in the National Survey for Student Engagement reported sleeping an average of 8.5 hours per night. CMU students, by contrast, reported sleeping an average of 6.16 hours per night.

Discussion

We have two goals for this research project. First, we are interested in gauging CMU undergraduates' perception of the workload they face while at Carnegie Mellon and how they feel that compares with other universities' workload. Second, we are interested in comparing Carnegie Mellon students' stated study hours with national statistics on undergraduate students' study hours in other universities, so as to gauge the actual workload rigor of CMU against other schools. We are ultimately interested in seeing how close perception and the reality of course-load rigor are.

On average, CMU students report spending 26 hours per week[6] on school work (including study time). This statistic far exceeds the national average of 13-14 hours of studying spent per week (National Survey of Student Engagement).[7] Furthermore, our survey has found that CMU students have spent roughly 5.7 hours in class (not including outside study time), on average, which exceeds the national average of studying 3.2 hours per weekday (Bureau of Labor Statistics). This is consistent with CMU students' perception of how their work/study habits compare with their peers at other schools. In this sense, there was nothing surprising or unexpected about our results.

A potential weakness in our survey lies in the fact that participants in our study might be motivated to overstate their work/study hours so as to validate their claims that CMU is one of the most rigorous universities in America. We attempted to correct this bias by asking questions pertaining to leisure, sleep, and other competing uses of participants' time, which would give us a holistic view of participants' daily and weekly routines, allowing us to better validate such claims.

The take-home message from our particular project is that students at Carnegie Mellon University are seemingly overworked relative to their peers at other institutions. Why is this important to know? From a purely academic perspective, without considering possible policy implications, these results validate students' widely held beliefs that they are "working harder" than their counterparts at other universities. Therefore, this serves as an interesting confirmation of what many already regarded to be the undisputed truth. Secondly, from a pragmatic perspective, this may or may not be a fact that university administrators care about. If the administrators conclude from our results that our students are working past the point that is generally agreed to be healthy, then they may want to adjust the curricula accordingly. For instance, the newly-instituted policy of allowing double-counting for courses is an example of change that the administration can effect in order to lighten the burden on students.

[6] Outliers omitted in this average (i.e. the two responses of "105")
[7] NSSE reports that this is about half of what faculty consider enough to do well in their classes.

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Appendices

Appendix 1: Survey

Demographic questions:

1. Are you a current CMU full-time (36 units or more) undergraduate student on the Pittsburgh Campus?
   Yes / No

2. What is your gender?
   Male / Female

3. What is your year in college?
   First Year / Sophomore / Junior / Senior/ Fifth Year

4. What college is your primary major in (circle one)?
   Carnegie Institute of Technology (CIT) / Humanities and Social Sciences (H&SS) / Tepper School of Business (TSB) / School of Computer Science (SCS) / Mellon College of Science (MCS) / College of Fine Arts (CFA) / Interdisciplinary or Other (Specify) _____

5. Are you an international student or a non-resident of the United States?
   Yes / No

6. What is your ethnicity? Circle one.
   -African American
   -Asian/Pacific Islander
   -American Indian/Alaskan Native
   -Hispanic
   -White
   -Other (Please specify): _____
   -Rather not disclose

7. Did you enroll in Carnegie Mellon as a first-year student?
   Yes / No

8. Have you been awarded financial aid (i.e. scholarships, grants, loans, etc.) from the university?
   Yes/ No

9. Do you currently live in university housing (this includes fraternity housing, as well as off-campus apartments provided by the university, such as Fairfax, Cathedral Mansions, Webster, etc.)?
   Yes/ No

10. Are you currently on a university meal plan (including DinEx plans)?

Yes/ No

Substantive questions:

11. How many courses are you taking this semester (including StuCos and Minis)? _____

12. How many courses per semester do you think the average CMU student takes? _____

13. How many units are you taking this semester? _____

14. How many units per semester do you think the average CMU student takes? _____

15. On average, how many hours a week do you spend studying for class (i.e. reading, studying, doing homework, etc)? _____

16. On average, how many hours per day do you sleep? _____

17. On average, how many hours per week do you spend on physical exercise (jogging, working out, etc.)? _____

18. On average, how many hours per day do you spend relaxing (napping, watching TV, listening to music, eating, etc.) and/or socializing? _____

19. On average, how many hours per day do you spend in class? _____

20. In comparison to your peers in the same college (i.e. SCS, CIT, Tepper,...) at CMU, do you think you spend more or less time studying? Circle one.

5	4	3	2	1
Significantly more time	**More time**	**Same**	**Less time**	**Significantly less time**

21. In comparison to the total undergraduate population at CMU, do you think you spend more or less time studying? Circle one.

5	4	3	2	1
Significantly more time	**More time**	**Same**	**Less time**	**Significantly less time**

22. In comparison to other American universities, do you think you spend more or less time studying?

5	4	3	2	1
Significantly more time	**More time**	**Same**	**Less time**	**Significantly less time**

23. How does the workload (i.e. homework, exams, projects, etc.) at CMU compare to what you initially expected college to be like? Circle one.

5	4	3	2	1
Far more than expected		**Just what I Expected**		**Much less than expected**

24. Based on your previous semesters, rate the rigor of this semester's workload. (i.e. difficulty of material, assignments, exams. How much time is necessary to receive desired grade?). Circle one below.

5	4	3	2	1
Significantly more rigorous	**More rigorous**	**Same**	**Less rigorous**	**Significantly less rigorous**

25. Are you involved in extracurricular activities (e.g. sports, clubs, job, etc.)? Yes / No

If yes, answer the following question. If no, skip ahead to question #27

26. To what extent does involvement in extracurricular activities (e.g. sports, clubs, jobs, etc.) affect your study time?

5	4	3	2	1
Great extent; I would have a letter grade higher if I only focused on school.		**It's challenging**, but it's manageable for me to take part in the things I enjoy, while still having time to study.		**Negligible extent**; I can balance school and extra curricular activities without any problem.

27. How satisfied are you with your current QPA?

5	4	3	2	1
Very Satisfied		**Satisfied**		**Not Satisfied at all**

28. What is your current QPA? Circle one range:

0 – 2.0 2.01 – 2.5 2.51 – 3.0 3.01 – 3.5 3.51 – 4.0

29. Based on statistics you've read, personal research, or interaction with older students or alumni, what is your perception of how the average starting salary for CMU undergraduates compares with your peers (same major) at other universities?

5	4	3	2	1
Significantly more	**More**	**Same**	**Less**	**Significantly less**
I will be at a great advantage upon graduation in terms of starting salary	I expect to make more money as a CMU graduate, but not that much more		I may be making less money than my peers at other schools, but at least I'm having more fun, right?!	I didn't come to CMU for superficial aspirations like "making money"

Appendix 2: Initial Invitation Letter

Hello,

You are receiving this email because you have been randomly selected to participate in this educational survey. Your name was chosen from the Carnegie Mellon C-book directory through a purely random process that utilized a computer-based random number generator.

We are conducting a study on the Carnegie Mellon Undergraduate student population and their average workload. We hope to utilize the information to not only quantify the average workload of a CMU student but to also see how our results compare with other colleges and universities nationwide.

The survey should not take longer than 10 minutes. It can be filled out at the following link:

<LINK>

By filling out the survey, you will be automatically entered into a raffle contest for a (PRIZE). The survey will close at 11:59 PM on April 1, 2008.

We hope you will fill out this short survey at your earliest convenience.

Thank you for your participation.

Sincerely,

Rafae Aziz
Kevin Kwan
Mansour Nehlawi
Chris Polanco

Note: Attached you will find a Consent Form detailing all related information about the study, including information about privacy, confidentiality, risks and benefits.

Appendix 3: Consent Form

We are conducting a study on the Carnegie Mellon Undergraduate student population and their average workload. We hope to utilize the information to not only quantify the average workload of a CMU student but to also see how our results compare with other colleges and universities nationwide. This is a one-time study that will be conducted through an online survey that should not last for more than 10 minutes. Chosen participants of this study will be provided a link through email. For this study, we do not foresee any risk or discomfort that might affect the participant. This study will not compensate participants other than knowing that you have contributed to a study that could be used on deciding policies and initiatives. For the survey, there will be no sensitive information or identifier that will be captured. Any information that can be used as an identifier will be captured on a separate website so that there is no way to identify a respondent's answers with their information. If there is any questions regarding this study (including subject rights) you can contact the researchers through their email addresses listed below:

Kevin Kwan: kkwan@andrew.cmu.edu
Rafae Aziz: raziz@andrew.cmu.edu
Chris Polanco: cpolanco@andrew.cmu.edu
Mansour Nehlawi: mnehlawi@andrew.cmu.edu

Though your participation is crucial to our study's success, participation is completely voluntary. During the survey you may quit at any time without any penalty.

Appendix 4: Benefits & Risks

By choosing to participate in this study, participants will be automatically entered in a raffle for an item that will be decided at that time. There will be no monetary compensation or definite tangible benefit just for being a respondent of the survey. An intangible benefit is that, by contributing to this study, there will be a better understanding of the workload of Carnegie Mellon students. We in hope to use this information to inform university officials so that they can take this information into account when deciding on school policies and initiatives. There will minimal, if any at all, risk involved in responding to this survey. Our emails will scanned for any viruses or spyware and no personal identifying information will be gathered in the survey so that there are no chances of identity theft.

Appendix 5: Stratified Sample Size Calculation

The process itself is similar to the sample size calculation for the entire university population, as shown on page 4. The main difference between the two sample size calculations, and a crucial part to stratified sampling, is that a simple random sample is taken from each stratum, as opposed to the entire population. This way, we get more representativeness from each stratum, since there is bound to be some variation between the classes (freshman, sophomore, junior, senior), and we want to adequately capture that class effect.

Stratum *(h)*	N_h	$S^2_{h,pop}$
1 (Freshmen)	1479	144
2 (Sophomore)	1426	100
3 (Junior)	1291	81
4 (Senior)	1172	225
5 (Other)	212	100

Stratum 1: Freshmen

$$s_1^2 = \frac{1{,}479 \times 144}{5{,}580} \approx 38.17 \Rightarrow SD = \sqrt{38.17} \approx 6.18$$

Strata 1 Sample Size Calculation (SRS w/o replacement):

$$n_1 \geq \frac{N_1 n_0}{N_1 + n_0}; where: n_0 = \frac{(1.96)^2 (6.18)^2}{3^2} \approx 16.29;\ n_1 \geq \frac{1{,}479 \times 16.29}{1{,}479 + 16.29} \approx 16.11$$

Assuming 25% response rate as we did before with the entire CMU population: $\frac{16.11}{.25} \approx 64.45$, so our desired sample size for the freshman class strata is 64 students or greater. This makes the sampling fraction is $f_1 = \frac{n_1}{N_1} = \frac{64}{1479} \approx .043$

Stratum 2: Sophomores

$$s_2^2 = \frac{1{,}426 \times 100}{5{,}580} \approx 25.56 \Rightarrow SD = \sqrt{25.56} \approx 5.06$$

$$n_2 \geq \frac{N_2 n_0}{N_2 + n_0}; where: n_0 = \frac{(1.96)^2 (5.06)^2}{3^2} \approx 10.91;\quad n_2 \geq \frac{1{,}426 \times 10.91}{1{,}426 + 10.91} \approx 10.83$$

Assuming 25% response rate: 10.83/0.25 ~ 43.31, which means that we want approximately 43 students in the sophomore class or more to be in our sample. $f_2 = \frac{n_2}{N_2} = \frac{43}{1426} \approx .0299$, so our sampling fraction will be approximately 3%.

Stratum 3: Junior Class

$$s_3^2 = \frac{1{,}291 \times 81}{5{,}580} \approx 18.74 \Rightarrow SD = \sqrt{18.74} \approx 4.33$$

$$n_3 \geq \frac{N_3 n_0}{N_3 + n_0}; where: n_0 = \frac{(1.96)^2 (4.33)^2}{3^2} \approx 7.9991;\ n_3 \geq \frac{1{,}291 \times 8}{1{,}291 + 8} \approx 7.95$$

Assuming 25% response rate gives us: 7.95/0.25 ~ 31.8, which means that we want our sample size for the junior class to be at least 32 students. Our sampling fraction is given by: $f_3 = \frac{n_3}{N_3} = \frac{32}{1291} \approx .025$

Stratum 4: Senior Class

$$s_4^2 = \frac{1{,}172 \times 225}{5{,}580} \approx 47.26 \Rightarrow SD = \sqrt{47.26} \approx 6.87$$

$$n_4 \geq \frac{N_4 n_0}{N_4 + n_0}; where: n_0 = \frac{(1.96)^2 (6.87)^2}{3^2} \approx 20.17;\ n_4 \geq \frac{1{,}172 \times 20.17}{1{,}172 + 20.17} \approx 19.83$$

Assuming 25% response rate: 19.83/0.25 ~ 79.3, so we want our sample size from the senior class to be comprised of at least 79 students. Our sampling fraction is then: $f_4 = \frac{n_4}{N_4} = \frac{79}{1172} \approx .0677$

Stratum 5: Other (e.g. fifth or sixth year undergraduates)

$$s_5^2 = \frac{212 \times 100}{5{,}580} \approx 3.8 \Rightarrow SD = \sqrt{3.8} \approx 1.95$$

$$n_5 \geq \frac{N_5 n_0}{N_5 + n_0}; where: n_0 = \frac{(1.96)^2 (1.95)^2}{3^2} \approx 1.62;\ n_5 \geq \frac{212 \times 1.62}{212 + 1.62} \approx 1.61$$

Assuming 25% response rate, as with the other strata, we arrive at: 1.61/0.25 ~ 6.43. So, our desired sample size for the "other" category of students is 6 or more students. This gives us the following sampling fraction: $f_5 = \frac{n_5}{N_5} = \frac{6}{212} \approx .03$

When we add together all the strata sample sizes, we get the sample size that we previously estimated assuming we had done an SRS of the entire CMU student population ($n_1(64) + n_2(43) + n_3(32) + n_4(79) + n_5(6) = n_{pop} = 224$). Accounting for variation due to rounding, this is approximately the same to the SRS calculation for the entire CMU population (226).

Appendix 6: Raw Survey Data

What is your gender?		
Male	**46**	**54.12%**
Female	39	45.88%
Total	**85**	
Mean	1.46	
Standard Dev.	0.50	
Variance	0.25	
What is your year in college?		
Freshmen	**28**	**32.94%**
Sophomore	25	29.41%
Junior	13	15.29%
Senior	16	18.82%
Fifth Year	3	3.53%
Total	**85**	
Mean	2.31	
Standard Dev.	1.22	
Variance	1.48	
What college is your primary major in?		
Carnegie Institute of Technology (CIT)	**31**	**36.47%**
Humanities and Social Sciences (H&SS)	12	14.12%
Tepper School of Business (TSB)	8	9.41%
School of Computer Science (SCS)	11	12.94%
Mellon College of Science (MCS)	10	11.76%
College of Fine Arts (CFA)	11	12.94%
Interdisciplinary or Other (Specify)	2	2.35%
Total	**85**	
Mean	2.98	
Standard Dev.	1.95	
Variance	3.79	
Are you an international student or a non-resident of the United States?		
Yes	7	8.24%
No	**78**	**91.76%**
Total	**85**	
Mean	1.92	
Standard Dev.	0.28	
Variance	0.08	
What is your ethnicity?		
African American	4	4.71%
Asian/Pacific Islander	25	29.41%
American Indian/Alaskan Native	0	0.00%

Hispanic	7	8.24%
White	**46**	**54.12%**
Rather not disclose	1	1.18%
Other (Please specify):	2	2.35%
Total	**85**	

Mean	3.91
Standard Dev.	1.56
Variance	2.42

Did you enroll in Carnegie Mellon as a first-year student?

Yes	**84**	**98.82%**
No	1	1.18%
Total	**85**	

Mean	1.01
Standard Dev.	0.11
Variance	0.01

Have you been awarded financial aid (i.e. scholarships, grants, loans, etc.) from the university?

Yes	**53**	**62.35%**
No	32	37.65%
Total	**85**	

Mean	1.38
Standard Dev.	0.49
Variance	0.24

Do you currently live in university housing (this includes fraternity housing, as well as off-campusapartments provided by the university, such as Fairfax, Cathedral Mansions, Webster, etc.)?

Yes	**65**	**76.47%**
No	20	23.53%
Total	**85**	

Mean	1.24
Standard Dev.	0.43
Variance	0.18

Are you currently on a university meal plan (including DineX plans)?

Yes	40	47.06%
No	**45**	**52.94%**
Total	**85**	

Mean	1.53
Standard Dev.	0.50
Variance	0.25

How many courses are you taking this semester (including StuCos and Minis)?

average	5.46

How many courses per semester do you think the average CMU student takes?

average	5.12

How many units are you taking this semester?

average	48.88

How many units per semester do you think the average CMU student takes?

average	48.4

On average, how many hours a week do you spend studying for class (i.e. reading, studying, doing homework, etc)?

average	26.8

On average, how many hours per day do you sleep?

average	6.16

On average, how many hours per week do you spend on physical exercise (jogging, working out, etc.)?

average	3.77

On average, how many hours per day do you spend relaxing (napping, watching TV, listening to music, eating, etc.) and/or socializing?

average	4.61

On average, how many hours per day do you spend in class?

average	5.54

In comparison to your peers in the same college (i.e. SCS, CIT, Tepper,...) at CMU, do you think you spend more or less time studying?

Significantly more time	3	3.57%
More time	26	30.95%
Same	**31**	**36.90%**
Less time	21	25.00%
Significantly less time	3	3.57%
Total	**84**	

Mean	2.94
Standard Dev.	0.92
Variance	0.85

In comparison to the total undergraduate population at CMU, do you think you spend more or less time studying?

Significantly more time	11	13.10%
More time	**30**	**35.71%**
Same	18	21.43%
Less time	21	25.00%
Significantly less time	4	4.76%
Total	**84**	

Mean	2.73

Standard Dev.	1.12	
Variance	1.26	

In comparison to other American universities, do you think you spend more or less time studying?

Significantly more time	**45**	**54.22%**
More time	26	31.33%
Same	10	12.05%
Less time	2	2.41%
Significantly less time	0	0.00%
Total	**83**	

Mean	1.63
Standard Dev.	0.79
Variance	0.63

How does the workload (i.e. homework, exams, projects, etc.) at CMU compare to what you initially expected college to be like?

Far more than expected	12	14.29%
	43	**51.19%**
Just what I expected	23	27.38%
	4	4.76%
Much less than expected	2	2.38%
Total	**84**	

Mean	2.30
Standard Dev.	0.86
Variance	0.74

Based on your previous semesters, rate the rigor of this semesters workload. (i.e. difficulty of material, assignments, exams. How much time is necessary to receive desired grade?).

Significantly more rigorous	15	17.86%
More rigorous	**28**	**33.33%**
Same	19	22.62%
Less rigorous	17	20.24%
Significantly less rigorous	5	5.95%
Total	**84**	

Mean	2.63
Standard Dev.	1.17
Variance	1.37

Are you involved in extracurricular activities (e.g. sports, clubs, job, etc.)?

Yes	**71**	**84.52%**
No	13	15.48%
Total	**84**	

Mean	1.15
Standard Dev.	0.36

Variance	0.13	

To what extent does involvement in extracurricular activities (e.g. sports, clubs, jobs, etc.) affect your study time?

Great extent; I would have a letter grade higher if I only focused on school.	10	14.08%
	22	**30.99%**
It's challenging, but it's manageable for me to take part in the things I enjoy, while still having time to study.	16	22.54%
	15	21.13%
Negligible extent; I can balance school and extra curricular activities without any problem.	8	11.27%
Total	**71**	

Mean	2.85
Standard Dev.	1.24
Variance	1.53

How satisfied are you with your current QPA?

Very Satisfied	11	13.41%
	13	15.85%
Satisfied	16	19.51%
	26	**31.71%**
Not Satisfied at all	16	19.51%
Total	**82**	

Mean	3.28
Standard Dev.	1.32
Variance	1.74

What is your current QPA?

0 - 2.0	0	0.00%
2.01 - 2.5	4	4.82%
2.51 - 3.0	17	20.48%
3.01 - 3.5	**33**	**39.76%**
3.51 - 4.0	29	34.94%
Total	**83**	

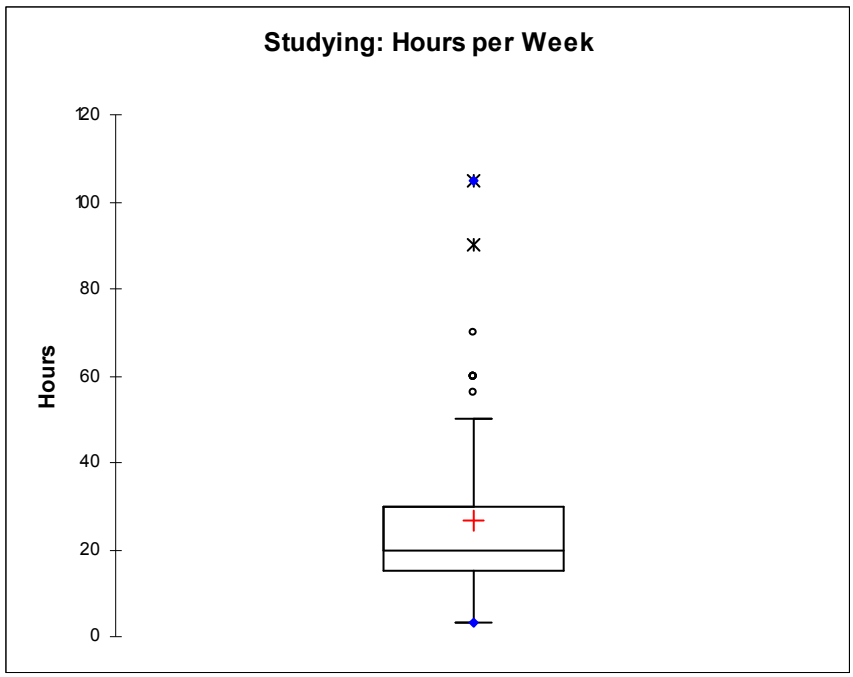
Mean	4.05
Standard Dev.	0.87
Variance	0.75

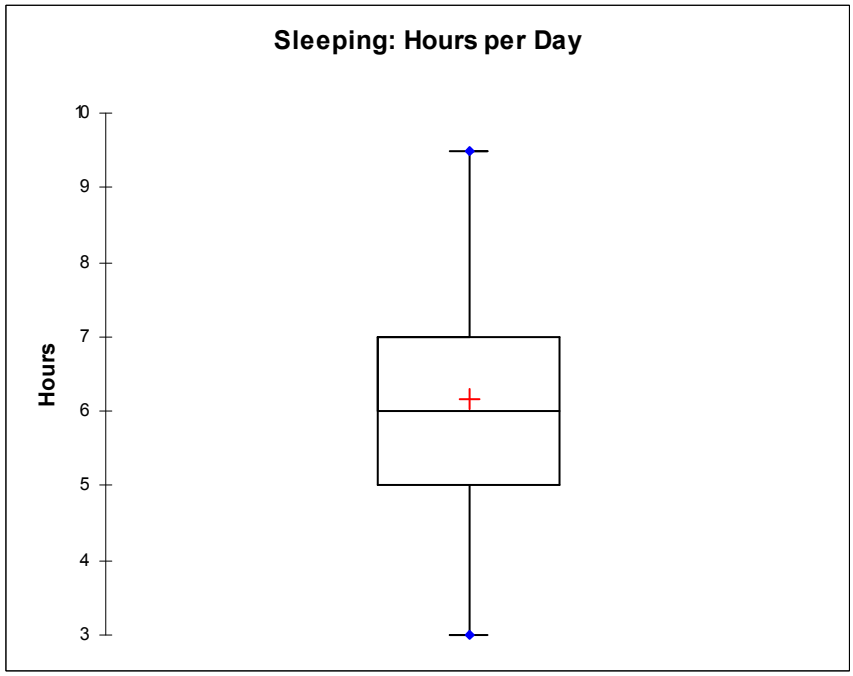
Based on statistics you've read, personal research, or interaction with older students or alumni, what is your perception of how the average starting salary for CMU undergraduates compares with your peers (same major) at other universities?

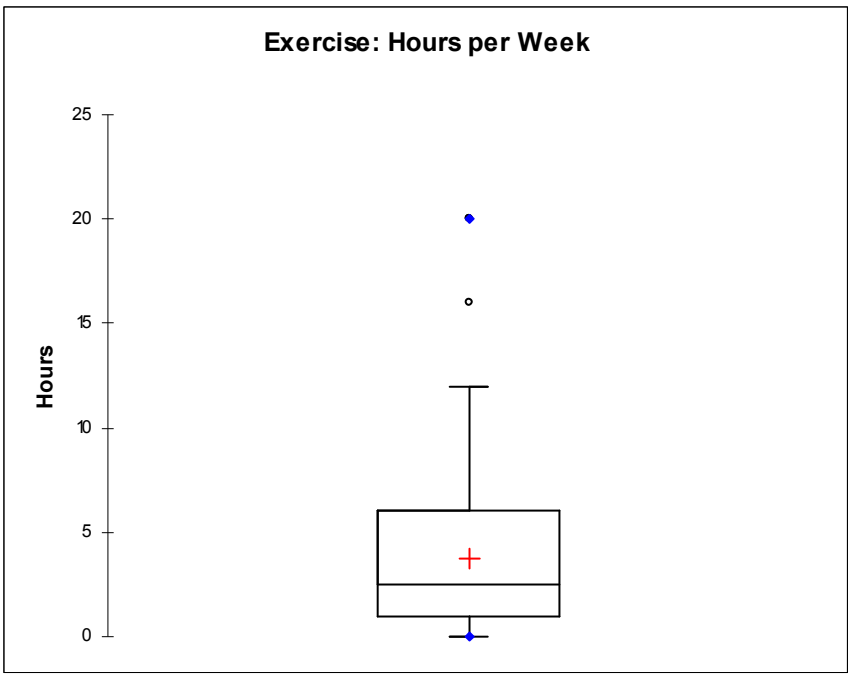
Significantly more	13	15.66%
More	**53**	**63.86%**
Same	16	19.28%
Less	1	1.20%
Significantly less	0	0.00%
Total	**83**	

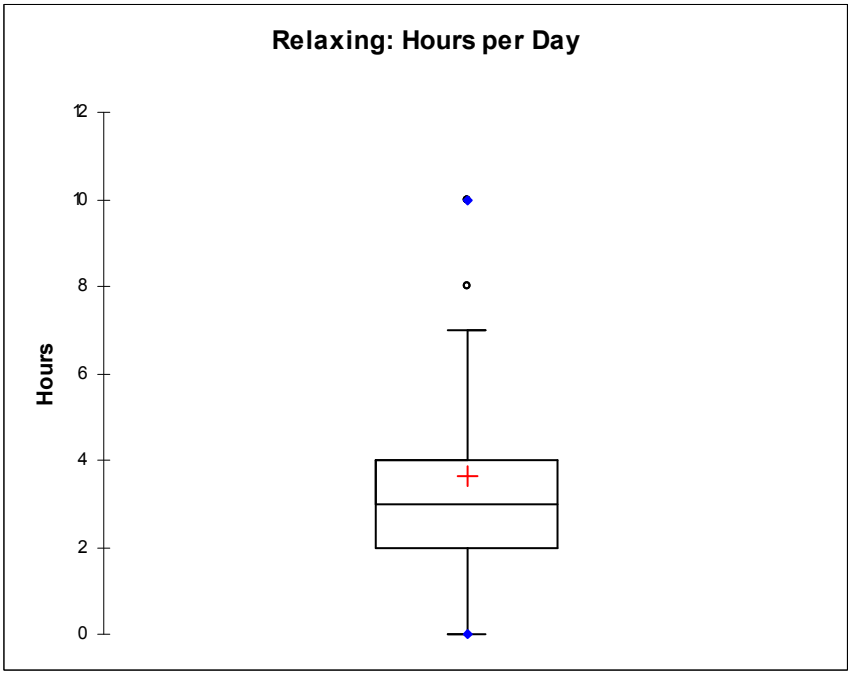
Mean	2.06
Standard Dev.	0.63
Variance	0.40

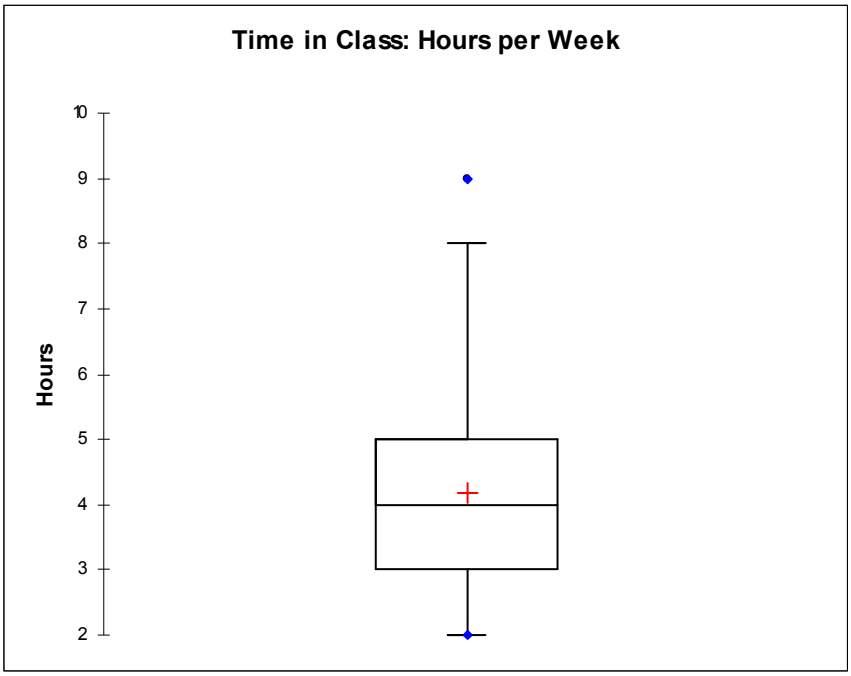
Appendix 7: Box Plots for 5 Weighted Responses






Exercise: Hours per Week
Hours
25
20
15
10
5
0


Relaxing: Hours per Day
Hours
12
10
8
6
4
2
0


Time in Class: Hours per Week
Hours
10
9
8
7
6
5
4
3
2