

congrats on 3rd prize at MoM!

interesting topic

good survey questions

very nice analysis and writeup

-BJ

The Undergraduate Perception and Utilization of Mandatory Fees at Carnegie Mellon University

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Introduction:

The research question being studied in this project is “Carnegie Mellon Pittsburgh Campus Undergraduates’ Awareness, Perception, Utilization, and Attitudes of Mandatory Fees across Non-Academic Resources.” Carnegie Mellon University has compulsory fees as part of its tuition. Specifically, these fees are the Student Activities Fee, Port Authority Fee, Media Fee, and Technology Fee. However, the student's participation in deciding how to spend these funds is limited by institutional constraints. This research study will analyze CMU Pittsburgh campus’s undergraduate students’ awareness and perceptions of how funds are distributed for non-academic resources. The study will also assess CMU students’ utilization of the services provided by the fees and their attitudes about the services and fees. Moreover, the survey will evaluate to what degree CMU students might want to participate in the decision-making process. The data will show if the funds provided by students are appropriately distributed according to their preferences.

Table 1: Undergraduate Student Tuition and Fees¹:

Freshmen Fall 2009			
Per-Unit Tuition Rate - \$560			
	Resident	Commuter	Off-Campus
Tuition	\$40,300	\$40,300	\$40,300
Orientation Fee	192	192	192
Activity Fee	184	184	184
Port Authority Fee	84	84	84
Media Fee	10	10	10
Technology Fee	150	150	150
Room & Fees ¹	6,060	0	5,560
Dining ²	4,280	1,670	3,970
Books & Supplies ^{3,4}	1,000	1,000	1,000
Personal/Misc. ³	1,400	1,400	1,400
Transportation ⁴	0	640	0
Totals	\$53,660	\$45,630	\$52,850

There are many sources of previous research and information available that is relevant to this study. The Carnegie Mellon Enrollment Services webpage provides information of Undergraduate tuition and fees. A research study conducted in the University of Toledo assessed students’ awareness and perceptions toward the mandatory activity fee². The main purpose of

¹Student Tuition and Fees at CMU: http://www.cmu.edu/hub/sa/sa_tuition0809.html

² Ott, Katherine. "Student’s awareness and perceptions of the activity fee at the University of Toledo: A descriptive research study." Thesis. The University of Toledo, 2009

their study was to determine whether the students were conscious that they pay a general fee each semester, the degree to which students can identify the dollar amount of the general fee, how accurately students can identify where funds from the general fee are allocated, and how students perceive the importance of organizations and activities receiving funds from the general fee. Hart F. Weichselbaum and Gary H. McClelland published a study, "Student Attitudes toward Mandatory Fees," in 1978, which found that, "Only graduate students advocated a cutback in services to obtain a reduction in fees; most students would accept higher fees to fund three new programs"³. "Paying for Technology: student fees and libraries," an article published by Janet Webster and Cheryl Middleton, surveyed students to explore how libraries may tap into technology resource fees as a possible source of funding for library technology⁴.

Through this research study, it has been found that 76.1% of respondents are aware of the port authority fee, 74.8% are aware of the activities fee, and 64.9% are aware of the technology fee, while only 49.5% of the sample was aware of the media fee. All quantifiable services provided by the fees are well utilized with the exception of the media fee. It has also been found that people's perception of the fees is not accurate as most subjects overestimated the fees.

Methods:

As mentioned previously, for this survey our target population was the undergraduate student body at the Pittsburgh campus of Carnegie Mellon University. To contact the population, we planned on using an online survey and emailing our sample with a link to the survey. Since Carnegie Mellon University provides all students with an email account, the sample frame is every undergraduate who actually checks their campus email account. Thankfully, the culture of CMU is such that most people do check their campus email account.

We decided a simple random sample would be best for this survey. It allowed us to very quickly select our sample and still be close to selecting the correct amount of students for each class. Also, if we found that the responses within different classes are incredibly biased, we can do post-stratification to adjust. With the SRS, we wanted a 10% margin of error. To get this margin of error we need 96.04 respondents. Most email surveys get around 25% response rate, and we wanted to make sure we are safe, so we factored in a 20% response rate and found that we needed approximately 500 people in our sample.

$$SD = \sqrt{p(1 - p)} = \sqrt{.25} = .5$$

http://etd.ohiolink.edu/sendpdf.cgi/Ott%20Katherine%20S.pdf?acc_num=toledo1239728340

³Weichselbaum, Hart F., and Gary H. McClelland. "Student Attitudes toward Mandatory Fees." Research in Higher Education 8 (1978): 241-54.

⁴"Paying for technology: student fees and libraries". The Journal of Academic Librarianship 25.6 (1999): 462-72. JStor. Web. 4 Feb. 2010.

$$n_0 \geq \frac{1.96^2}{.1^2} = 96.04$$

$$n \geq \frac{Nn_0}{N + n_0} = \frac{5892(96.04)}{5892 + 96.04} = 94.49 \approx 100 * 5 = 500$$

To collect our sample we used the campus directory book to gather our list of names and email addresses. This book contained the email address for all students at CMU including graduate students. To look up an email address we needed three random numbers. The first random number was the page number, the second was the column number, and the fourth was the row number. If there was no student at that location another set of random numbers was generated and another student chosen. Also, if the student was not an undergraduate, another set of random numbers was generated and another student chosen. After we had a list of 500 students, we use SurveyMonkey.com to create the survey and sent out to everyone an email explaining the survey, and giving them the link. In the email, respondents were able to opt-out of any future emails as well. We followed up the first email with a reminder two days later, and a second reminder six days later. We have had 153 responses and 19 opt-outs. The survey is designed such that a respondent cannot finish it without answering all of the questions, so partial responses were not an issue.

Our survey was separated into 6 sections. We had demographics, awareness of fees, media fee questions, port authority fee questions and student activities fee. The Demographic questions were standard demographic questions which we later on used to post stratify our results. The awareness of fees section was made up of two questions per fee. The first question asked if the subject was aware of the fee, and the second question asked if they were then how much did they think the fee cost. For the next 4 sections we asked various questions about the fee in an attempt to learn how well people utilize the fees. See Appendix 3 for a full list of the questions we asked.

Looking at our demographics and the ratio of people that have responded, we noticed that post-stratification would greatly increase the quality of our results. Using the demographic information obtained from the CMU Fact book⁵, we were able to find weights for 24 different strata. We post-stratified on college and year, and all of the weights can be seen in Appendix 4. To obtain these weights we would do the population proportion divided by our respondent proportion. We then applied the weights to all of our data points and used the Jackknife method to figure out variances.

Results:

Demographic Results and Post-Stratification

Having applied the proper weights to each of our data points based on the respondents' year in school and college enrolled, we analyzed our data with aim to answer our original research question of how CMU undergraduates perceive and utilize the four mandatory fees that they pay each semester. After the initial six questions that pertained to demographic information of the respondents, the remaining questions in our survey asked about general awareness of,

⁵ Fact Book: <http://www.cmu.edu/ira/factbook/facts2010.html>

attitudes towards, or utilization of the four fees: the Port Authority Fee, the Media Fee, the Technology Fee, and the Student Activities Fee.

Awareness of the Fees

The first eight non-demographic questions asked students whether or not they were aware of each fee and, if they were aware, to make a guess on how much each fee actually costs per semester. The results with the post-stratified weights applied showed that 76.1% of our respondents were aware of the Port Authority Fee, 49.5% were aware of the Media Fee, 64.9% were aware of the Technology Fee and 74.8% were aware of the Student Activities Fee. These results clearly indicate that Carnegie Mellon undergraduate students are less aware of the Media Fee than any other fee, and with the exception of the Media Fee, the majority of students are aware of each of the other fees.

For the follow-up question, which asked students that said they were aware of the fee to guess the cost of it per semester, we did not have 153 responses partly because those who answered 'no' to the preceding question were instructed to skip the question, but also because some people who did claim to be aware of the fees chose not to respond. Because it was an open ended question, we also encountered issues with people answering with ridiculous numbers. Anybody who answered 0, because the respondent, especially if he or she already claimed to be aware of the fee, obviously knows that the fee is not 0 dollars, or who answered with a number that we determined to be too high, such as the respondent who guessed the Technology Fee to cost \$16,000 per semester, had their answers removed. Of the people who answered with a reasonable response (there were 92 reasonable responses for the question about the Port Authority Fee, 55 for the Media Fee, 69 for the Technology Fee and 79 for the Student Activities Fee), we calculated both the mean and median guess for the cost of each fee and compared these figures to the actual cost of each fee.

Mean, median, confidence interval

As mentioned earlier, we had two different kinds of item nonresponse from the question about guessing the cost of each fee. Some people did not respond because they were instructed not to respond, while others chose not to respond despite being instructed to answer. Before deciding whether or not we wanted to impute the missing data from the respondents who should have answered the questions, we first wanted to examine the potential reasons for the nonresponse. People could have chosen ^{not (?)} to respond because, even though they know that the fee exists, they have no idea how much it costs. This would be a useful nonresponse because it would further show us the relative awareness of the four different fees. But people also could have chosen not to respond because they realized the question was optional and were too lazy to answer the optional questions. If that is the case, we would want to impute the data because the response rates tell us nothing if all they are indications of peoples' laziness.

We found that the nonresponse rates ($1 - \frac{\text{number of viable guesses of the cost of the fee}}{\text{number of people who answered that they were aware of the fee}}$) for the Port

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Authority Fee, Media Fee, Technology Fee and Student Activities Fee were 22.9%, 27.6%, 30.3% and 31.9% respectively. The first thing that one notices is the increasing nonresponse rate as the questions progress. This could be coincidental and it could actually be an indication that students are less aware of the costs of the Student Activities Fee than the other fees. But that would contradict what we found earlier when we saw that the question asking student how much Student Activities Fee costs yielded the guess that was closest to the actual cost of the fee. We believe that the increasing nonresponse rates are the result of people realizing that the questions are optional or becoming tired with the survey as the questions go on, and thus are indications of respondents' laziness rather than awareness of the fees, which leads us to want to impute our data. But because we cannot know for certain what lead the respondents to skip the questions, we still analyzed the unimputed results before imputing our item non-response.

The unimputed values according to each of the following fee resulted in a mean of \$61.54 for the Port-Authority Fee, \$18.62 for the media fee, \$91.14 for the Technology Fee and \$85.79 for the student activity fee. This signifies that for most of the different fees, respondents identified that they were aware but overestimated the actual value of each of the fees. These shows that in terms of awareness students tend to overestimate the cost of each fee.

We determined if a missing response value was due to a lack of knowledge of the fee or just omission because it was optional. For imputation we took the mean of each the responses according to the different categories chosen when doing post-stratification weights and imputed the missing values, because it was a good method of identifying similar respondents and substituting a value for the item non-response. The imputation shows a slightly higher estimation for the mean of each fee. The imputation results according to each of the following fee resulted in a mean of \$69.57 for the Port-Authority Fee, \$64.95 for the media fee, \$104.36 for the Technology Fee and \$109.00for the student activity fee. We can see that with imputation the mean for all of the fees increased, when compared to the means without imputation. This still indicates that in terms of awareness, undergraduate students still overestimate the actual value of the fees per semester.

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Port Authority Fee:

For the Port Authority Fee, we were primarily interested in two statistics: how much students *are* willing to pay for the fee each semester, and how much students *should* be willing to pay for the fee based on how often they ride the bus and how much they would pay over the course of the semester for each bus ride. For each statisitc, we were interested in finding the mean, the median, and the percent of student with an answer greater than \$42, which is the actual cost of the fee. First, we asked students an open ended question of how much they would be willing to pay as a flat rate per semester given that a zone 1 ride normally costs \$2.00 and a zone 2 ride normally costs \$2.75. While the average amount that students were willing to pay was \$73.74, the median was only \$32.59, a result of the fact that the distribution of student' prices at which they would be willing to pay for the bus services is skewed to the right due to the people who take the bus very frequently. Once again, because this question was open-ended, we had to

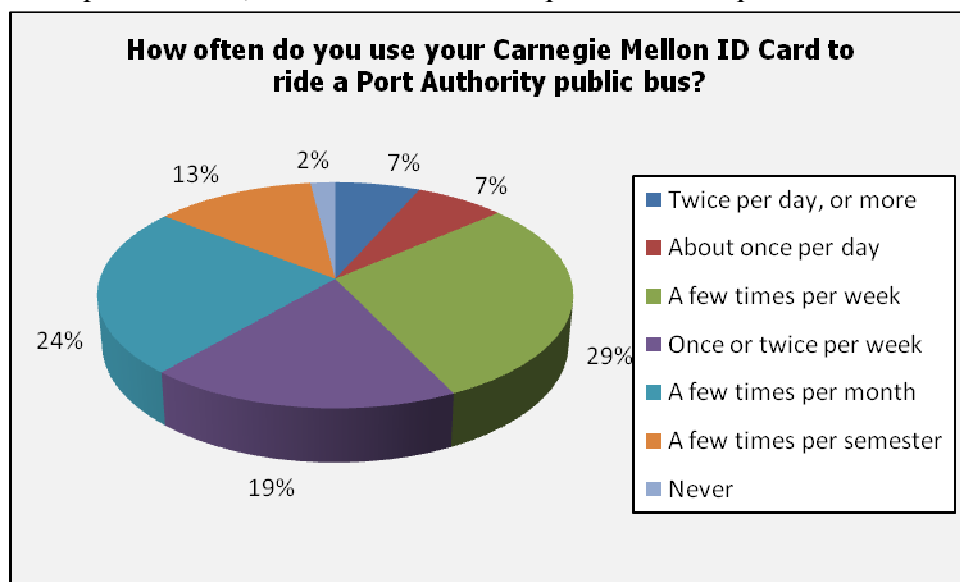
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nicely done.

remove some ridiculous answers that did not appear to be honest answers. We also constructed a 95% confidence interval for the average willingness to pay for the Port Authority Fee by finding the margin of error to be $(1.96)(s/\sqrt{n}) = (1.96)(6.44/12.36) = 1.02$, using the Jackknife variance calculations, and a corresponding confidence interval of (73.72, 75.76). Despite the high willingness to pay for the fee on average, because the median is less than the actual fee of \$42, one can see that only a minority of students are willing to pay the Port Authority Fee. In fact, only 36% of respondents claimed that they would pay a price of greater than or equal to \$42. The

standard error for the percentage of students willing to pay the \$42 is equal to $\frac{\sqrt{p(1-p)}}{\sqrt{n}} = \frac{\sqrt{.36(.64)}}{\sqrt{153}} = .0388$, so the margin of error for a 95% confidence interval is $1.96(.0388) = .0761$ and the 95% confidence interval for the percentage of students willing to pay the \$42 fee is (.28, .44). Therefore we can say with more than 95% confidence that a minority of Carnegie Mellon undergraduates claim to be willing to pay the \$42 Port Authority Fee.

Asking students to name a price and comparing that price to the actual \$42 most likely yields a lower proportion of students who we recorded as willing to pay the fee than had we told students that the fee is \$42 and then asked them if they would be willing to pay this. This is because of the large number of people who gave answers close to \$42.

The second statistic we wanted for comparison is the amount that students *should* be willing to pay for the fee based on how often they ride the bus. To do this, we asked student how often they use their Carnegie Mellon ID card to ride the Port Authority busses in a multiple choice formatted question with answers as follows: "Twice per day or more," "About once per day," "A few times per week," "Once or twice per week," "A few times per month," "A few times per semester," and "Never." The responses to this question are shown in Figure 1. From



these responses, we then calculated the number of times each student rides the bus per semester. We did this by coding each categorical response as a number. Twice per day or more correlated to 2.5 rides per day or 300 rides per semester,

about once per day correlated to 1 ride per day or 120 rides per semester and the rest of the numerical categories, in order, are .5 rides per day or 60 rides per semester, .2143 rides per day

or 25.71 rides per semester, .1333 rides per day or 16 rides per semester, .0333 rides per day or 4 rides per semester, and 0 rides per day. Using the coded responses, we can then find an average and median number of times per semester that our respondents ride the bus as well as the percentage of students who would spend more than \$42 per semester had they purchased each ride individually. On average, we found student ride the bus 55 times per semester, with a margin of error equal to $(1.96)(s/\sqrt{n}) = (1.96)(10.728/\sqrt{153}) = 1.6999$ and a confidence interval of (53.3,56.6981) with 95% confidence. With the cost of each bus ride at least \$2.00, the amount the each student would spend on busses without the fee is greater than \$110 and we can say with 95% confidence that the average worth of the Port Authority Fee is more than the actual cost of \$42 because the lower limit of our confidence interval corresponds to more than \$106.6 spent. The median number of times one of our respondents rode the bus per semester is 25.72, which also corresponds to more money than \$42 (\$51.44), and indicates that a majority of students in our sample should be willing to pay more than \$42. 61.4% of our sample actually should be willing to pay the \$42 fee based on each individual's coded responses to how often they ride the bus, and based on the fact that each bus ride costs approximately \$2.00. Figure 3 shows a chart of the proportion of students who The 8 people that ride the bus 300 times per semester, 12 people that ride the bus 120 times per semester, 46 people that ride the bus 60 times per semester, and 32 people ride the bus 25.71 times per semester all would be spending more than \$42 while the 34 that people ride the bus 16 times per semester, 17 people that ride the bus 4 times per semester and 3 people that never ride the bus do not utilize the bus fee well. We simply summed the number of people that ride the bus enough times and divided by 153 to find the proportion of 61.4% of students that utilize the fee well. This proportion has a margin of error for

a 95% confidence interval equal to $(1.96)(\frac{\sqrt{p(1-p)}}{\sqrt{n}}) = (1.96)(\frac{\sqrt{.614(.386)}}{\sqrt{153}}) = (1.96)(.0394) = .077$ and a confidence interval of (.537, .691). Therefore, we can say with more than 95% confidence that the majority of Carnegie Mellon undergraduate students utilize the Port Authority Fee well because the majority of the students would be spending more than \$42 had they been required to purchase each individual ride.

There is a statistically significant difference between the average willingness to pay and the average utilization of the Port Authority Fee as well as the difference between the proportion of students who were willing to pay \$42 and the proportion of students who would be spending more than \$42 on busses without the fee. These differences are the result of the Port Authority Fee being a lot fairer than it is perceived to be as well as people underestimating both the cost of riding the bus and the value of the fee.

Media Fee:

We used a similar method as with the Port Authority Fee to calculate how much each student would be spending on newspapers had there not been a flat rate per semester but rather newspapers that can be purchased for \$1 per issue. 8 people read the newspaper "daily," which we coded as 120 times per semester, 9 people read the newspaper "weekdays only," which we

coded as 85.71 times per semester, 1 person reads the newspaper “weekends only,” which we coded as 34.28 times per semester and 17 people read the newspaper “weekly,” which we coded as 17.14 times per semester. These 35 people all would be spending more than the actual \$5 per semester on newspapers and thus are utilizing the media fee well. The remaining 117 people in our sample said they read the newspaper “monthly” (4 times per semester, 13 people), “rarely” (2 times per semester, 56 people) or “never” (48 people). Overall, that amounts to just 23% of our sample that utilizes the fee well, while the remaining 77% are wasting money with the fee. However, the fee is only \$5 per semester so it is hard to say that the fee is unfair or a waste of money, and additionally, the average number of times a student reads a newspaper is 14.61 times per semester due to the right-skewness of the distribution, and that number is worth more than the \$5 fee.

The confidence interval for this mean can be found using the margin of error of $(1.96)(8.6567/\sqrt{153}) = 1.3717$, which leads to a confidence interval of (12.24, 15.98) for both the average number of times per semester a Carnegie Mellon undergraduate student reads the newspaper and the dollars that the average student would spend on newspapers without the fee. Therefore, despite the fact that only a minority of students utilize the Media Fee well, we can say with 95% confidence that on average, students do in fact utilize the fee well. We also asked another awareness question about the Media Fee, asking students to identify which newspapers are provided by the fee. The results can be seen in a graph in Appendix 5, but 69% correctly identified the Pittsburgh Post Gazette, 82% correctly identified the New York Times, and 64% correctly identified the USA Today.

Technology Fee:

We asked two additional questions specific to Technology Fee in our survey: which software packages has the student downloaded and used, and whether or not the student feels that their major required use of the Technology Fee. Like the Port Authority Fee, we can compare how many people feel like the Technology Fee is fair with how many people utilize the fee well and actually get their money’s worth. We asked students to choose any software package that they have used from the following list of licensed software that is provided by the Technology Fee:

- Allegro Common Lisp
- Analytica
- Maple
- Mathematica for Students
- Matlab
- Minitab
- RobotStudio
- S-PLUS
- SAS

- X-Win32
- Public Printing Installers
- Fetch
- Fugu SFTP
- X-Win32
- Java Runtime Environment (JRE)
- Oracle Calendar Client
- Oracle Calendar Client / KFW
- Oracle Calendar Sync
- Carnegie Mellon Web Certificates
- Identity Finder
- Kerberos for Macintosh
- Norton AntiVirus
- Spybot - Search & Destroy
- Symantec AntiVirus
- Cisco VPN Client
- SSH Secure Shell

For each software package, we found how much it would actually cost each student had everybody been required to purchase the software on their own. Then we assigned each package a numerical value based on that cost, and for each individual respondent, we were able to find how much money they would have spent over the course of the semester on technology if there were no Technology Fee. From these data points, we looked at the average money spent of technology, the median money spent of technology and the proportion of students who would be spending more than the actual fee of \$75.

The average amount of money spent per semester for students in our sample was \$2439.10. The margin of error for the mean is $(1.96)(s/\sqrt{n}) = (1.96)(18.6876/\sqrt{153}) = (1.96)(1.51) = 2.96$ and the corresponding 95% confidence interval is (2436.14, 2442.06). The median money spent on technology is \$1778.20. Both of these center estimates are very much higher than the actual cost of \$75, but extremely large difference does not correlate to as high of a proportion of students utilizing the fee well, as one might expect. 69.3% of students would be spending more than the actual fee, and while this is a majority, it is not as strong of a majority as one might expect just from looking at the mean and median. This is because there is a significant number of people who use only the very cheap or free software. Chart 10 in appendix 5 illustrates this well.

80.8% of our sample said that they feel that their major requires the use of the technology fee. Surprisingly, and unlike the Port Authority Fee, this proportion is higher than the proportion of people who utilize the fee well. The margin of error for this proportion based off of a 95% confidence interval = $(1.96)(s/\sqrt{n}) = (1.96)(.1146/\sqrt{153}) = .0181$, yielding a 95% confidence interval of (.7899, .82.61). While we did not ask each student for their major, we do have what

school they are enrolled in, and we can then find the cross-tabulated proportions for how many students believe that their major requires use of the technology fee within each school. CIT, SCS and MCS had the three highest proportions of students responding yes, with 91.9%, 82.1% and 82.1% respectively. CFA had the lowest proportion with just 58.8% of their students responding yes, while Tepper and HSS had proportions of 71.3% and 73.7% respectively.

Student Activities Fee

By action of the Board of Trustees, a required Student Activities Fee (in addition to tuition) is charged to all undergraduate students and graduate students who enroll for 19 units or more. For academic year 2009-2010 this fee is \$92 per semester/\$184 per year⁶. This fee provides funding for the numerous student organizations on campus as well as various events/activities provided for the students.

However, there is no feasible way to quantify the utilization of the student activities fee due to the diversity of the numerous student organizations and events. The different student organizations receive different amounts of funding from the Joint Funding Committee for their various purposes. Furthermore, membership of said organizations can be arbitrary: many students are members of more than one student organization. However, gaining membership to an organization is as simple as adding one's email to an email list. It is impossible to distinguish between active and non-active members, further complicating the "value" of their use of the student activities fee.

Instead, we can measure how aware students are of the fee and how many students think that the fee is fair. We can also gain a limited glimpse of how well the fee is utilized by asking students which, if any, of the concerts provided by AB Concerts they have attended (which receives one of the largest subsidies from JFC). 74.2% of respondents had not attended any concerts. Students were asked, "Who decides how most of the student activities fee is allocated?" in order to assess their awareness. 59.3% of our respondents did not know. Nonetheless, despite having limited awareness of the details of the fee and despite not going to many of the concerts provided by AB Concerts, 63.2% of our respondents thought the fee was fair.

We believe students felt this way due to the opportunities the fee provides students to participate in. To further illustrate this, we looked at the difference of the percentages of students who thought the fee was fair among those who are members of student organizations and those who are not. 68.7% of students in student organizations thought the fee was fair while only 39.5% of students not in student organizations thought the fee was fair. The majority of students who are in student organizations (75.163%) and the majority who think the fee is fair (63.2%) leads us to believe that students generally utilize this fee as well. The 95% confidence interval of the number of students that are in student organizations can be found by using the margin of

⁶ CMU Policies - Student Activities Fee: <http://www.cmu.edu/policies/documents/ActivitiesFee.html>

error of $(1.96) \left(\frac{\sqrt{p(1-p)}}{\sqrt{n}} \right) = (1.96) \left(\frac{\sqrt{.75163(1-.75163)}}{\sqrt{153}} \right) = .0685$, yielding an interval of (.68,.82). The 95% confidence interval of the number of students feel the student activities fee is fair can be found by using the margin of error of $(1.96) \left(\frac{s}{\sqrt{n}} \right) = (1.96) \left(\frac{.0849}{\sqrt{153}} \right) = (1.96)(.0068) = .0134$, yielding an interval of (.62,.65).

Discussion:

For this survey, we are trying to determine the validity of imposing mandatory fees on undergraduate students at Carnegie Mellon University. Since the student's participation in deciding how to allocate the mandatory funds is limited by institutional constraints, it is interesting to see not only if they are aware of them but if they actually utilize the given resources. We started by asking questions that were aimed at identifying if the respondents were truly aware that these mandatory fees were part of their tuition charges for each semester. Also, questions that asked for an estimate of the each fee allowed for further estimation of awareness. Then, utilization question were used to determine if the distribution of the mandatory fees was reasonable in comparison with their actual use. Lastly, we wanted to conclude if the respondents thought that the mandatory fees were fair. By gauging these different aspects, we can draw out conclusions that outline the main reasons for usability and thus determine if they are worth being mandatory.

For determining utilization we looked at the technology fee, port-authority fee and media fee. In the fees that we could quantify, the results show that the technology fee and the port-authority fee were well-utilized by more than 50% of undergraduates. The cost of the media fee was more than its median utilization. Since the media fee cost is very low at \$5.00 per semester we can still consider this fee as fair. The student fee was very difficult to quantify, but based on the results because the majority of undergraduate students at Carnegie Mellon University are part of a student organization this fee is also fair.

The perception and awareness of each fee further help analyze undergraduate students' attitude toward having this mandatory fees. Undergraduate students tend to underestimate their actual need for the resources that are provided by each fee. The only exception was for the media fee in which the majority of undergraduate students (78.5%) felt that its value should be less than its actual cost. In general undergraduate students also tended to overestimate the cost of each mandatory fee on their total tuition cost per semester. In regards to perception, we can conclude that students believe that the cost of each fee is higher than its actual cost. This indicates that undergraduate students at Carnegie Mellon underestimate the validity of each of these fees, although as previously mention their usability determines that they are mostly fair. The low awareness might indicate the need to make information about mandatory fees more accessible to students. We also determined that most students think that the Pittsburgh Port Authority is generally reliable and does a good job, but around close to 40% stated that is was unreliable which might indicate that there could be room for improvement of their services.

Some of the strengths of this project study were the high response rate of 30.8%, and the fact that almost all of the questions required answers. The demographic questions allowed us to identify the necessary categories for which to calculate the relevant weights for post-

stratification. Some of the weaknesses were the open-ended questions asking for estimation of cost for each fee. Open-ended questions led to item-response for which we had to resort to using imputation. For this type of study there are several things to keep in mind. Pre-testing is very important to catch mistakes beforehand. Complete demographic questions are very important for post-stratification. Actual numbers for populations is difficult to find, but one must rely on resources available and choose the information that would be most relevant for your results. Phrasing of the questions is very important to avoid further adjustments. We hope that with our research project results decision making entities, can decide whether the funds are correctly allocated and increase awareness for the mandatory fee among the undergraduate students.

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nice set of refs. Format not quite in requested form.

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Appendix 1:

The Email:

Subject: What do you think about mandatory student fees?

Body: Dear Student,

We're a team of students doing a survey for our 36-303 survey class. Our survey is about your attitude towards how our tuition and mandatory fees are used for non-academic resources.

We have randomly selected you to complete our survey, which should not take more than 5 minutes. We need your help to make this project a success, so please fill it out!

Here is a link to the survey:

<http://www.surveymonkey.com/s.aspx>

With much appreciation,

Joe Burgess

Alexandra Lecompte

John Lee

Ben McGrath

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.

<http://www.surveymonkey.com/optout.aspx>

Appendix 2:

Consent Form:

This study is aimed to identify Carnegie Mellon Undergraduate Student's perception and utilization of mandatory fees. We hope that this information will help us determine not only the awareness of the students about the fees, but whether they are fair. The selected participants were chosen randomly from the CMU C-book. They will be provided with a link for the survey. This survey should take around 5 minutes. There is no compensation for completing this survey, but participants will provide valuable information needed for this study. Any sensitive information

given or other identifiers will be kept confidential and will only be used for relevant conclusions about the survey. Any questions about the study can be sent to the following emails:

Joe Burgess : jmburges@andrew.cmu.edu

Alexandra Lecompte : avlecomp@andrew.cmu.edu

John Lee: jal@cmu.edu

Ben McGrath: bmcgrath@andrew.cmu.edu

Appendix 3:

The Survey:

1. How many years have you been a Carnegie Mellon student?

2. What college are you in?

- ☐ CIT
- ☐ HSS
- ☐ MCS
- ☐ SCS
- ☐ Tepper

3. What gender are you?

- ☐ Male
- ☐ Female

4. Do you live on or off campus?

- ☐ Off-Campus
- ☐ On-Campus

5. Are you a member of any student organization?

- ☐ Yes
- ☐ No

6. Are you an international student?

- ☐ Yes
- ☐ No

along with listing the questions, it would be helpful for the sake of completeness to indicate the number and percent of responses in each category for each question.

-BJ

7. Carnegie Mellon charges a flat rate Port Authority fee that allows all students, faculty and staff to ride the bus using just their CMU ID. Are you aware of the flat rate per semester Port Authority fee?

- ☐ Yes
- ☐ No

8. If you are, how much does the Port Authority fee cost per semester?

9. The Media Fee is charged to all undergraduate students with 19 or more units to make select local and national newspapers freely available. Are you aware of the Media Fee?

- ☐ Yes
- ☐ No

10. If you are, how much does the Media Fee cost per semester?

11. Carnegie Mellon charges a Technology Fee to cover the costs for all licensed software as well as the computers around campus. Are you aware of the Technology Fee?

- ☐ Yes
- ☐ No

12. If you are, how much does the Technology fee cost per semester?

13. Carnegie Mellon charges a Student Activities Fee that is used to support activities and facilities which can be described as meeting the reasonably predictable social, cultural, recreational or welfare needs of college students. Are you aware of the Student Activities Fee?

- ☐ Yes
- ☐ No

14. If you are, how much does the Activities Fee cost per semester?

15. Do you feel that your major require use of the technology fee?

- ☐ Yes
- ☐ No

16. How often do you use your Carnegie Mellon ID Card to ride a Port Authority public bus?

- ☐ Twice per day, or more
- ☐ About once per day

- A few times per week
- Once or twice per week
- A few times per month
- A few times per semester
- Never

17. A Zone 1 (local) fare is \$2, and a zone 2 (28X, malls, etc.) fare is \$2.75, how much would you pay as a flat rate per semester for the port authority fee?

18. Overall, what are your feelings toward the job that the Port Authority of Alleghany County does regarding bus service?

- I feel that the buses are generally reliable, and Port Authority does a good job
- I feel that the buses are generally unreliable, and Port Authority does not do a good job
- I do not take the buses enough to have an opinion on them

19. The Newspapers that are provided by the media fee are located in red boxes across campus, which newspapers can be found in those boxes Choose all that apply:

- The Pittsburgh Post-Gazette
- Pittsburgh Tribune Review
- New York Times
- New York Post
- USA Today
- Boston Globe
- Washington Post
- Other (please specify)

20. How often do you read the local and national newspapers provided by the Media Fee?

- Daily
- Weekdays only
- Weekends only
- Weekly
- Monthly
- Rarely
- Never

21. The following is a list of downloadable licensed software that Carnegie Mellon Students have access to and are supported by the tech fee. Select all that you have at one point downloaded and used.

- Allegro Common Lisp
- Analytica
- Carnegie Mellon Web Certificates
- Cisco VPN Client
- Fetch
- Fugu SFTP

- Identity Finder
- Java Runtime Environment (JRE)
- Kerberos for Macintosh
- Maple
- Mathematica for Students
- Matlab
- Norton AntiVirus
- Oracle Calendar Client
- Oracle Calendar Client / KFW
- Oracle Calendar Sync
- Public Printing Installers
- RobotStudio
- SAS
- S-PLUS
- Spybot - Search & Destroy
- SSH Secure Shell
- Symantec Antivirus
- X-Win32

22. Do you feel that the Student Activities Fee is fair?

- Yes
- No

23. Who decides how most of the student activities fees are allocated?

- Student Senate
- Activities Board
- Joint Funding Committee
- I don't know

24. Which of these concerts put on by ABCConcerts have you seen this school year?

- Movits
- Donora
- aeroErotique
- Aesop Rock
- Art Decade
- Gentlemen Auctionhouse
- Revision
- Battlecake
- The Show
- None of the above

Appendix 4:

Weights:

CFA Freshmen	1.183673
CFA Sophmores	1.8247
CFA Juniors	3.0068
CFA Seniors	1.5553
Tepper Freshmen	.7551
Tepper Sophmores	.4375
Tepper Juniors	1.5067
Tepper Seniors	1.2704
H&SS Freshmen	.9166
H&SS Sophmores	1.389
H&SS Juniors	1.7788
H&SS Seniors	.9350
MCS Freshmen	1.3848
MCS Sophmores	.5646
MCS Juniors	.9294
MCS Seniors	.7387
SCS Freshmen	.9257
SCS Sophmore	1.3112
SCS Juniors	.6860
SCS Seniors	1.6122
CIT Freshmen	.9257

indicating how these were
calculated would be helpful

CIT Sophmores	1.3112
CIT Juniors	.6860
CIT Seniors	1.6122

Appendix 5:

Port-Authority:

Chart 1:

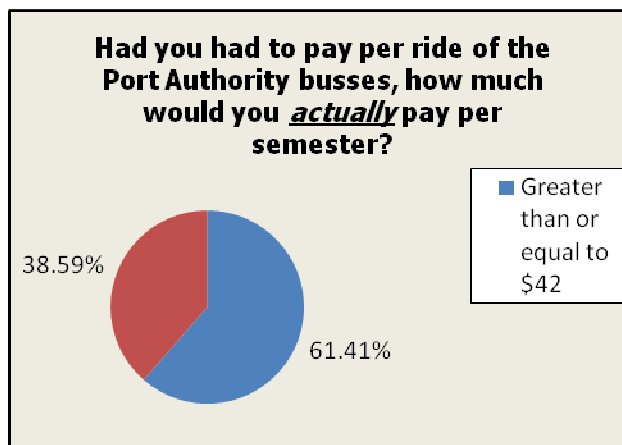


Chart 2:

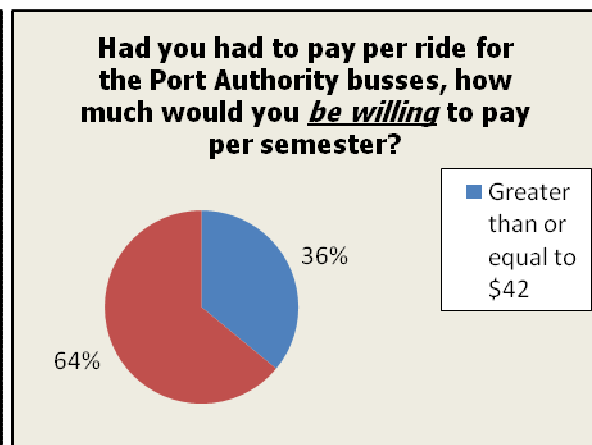


Chart 4:

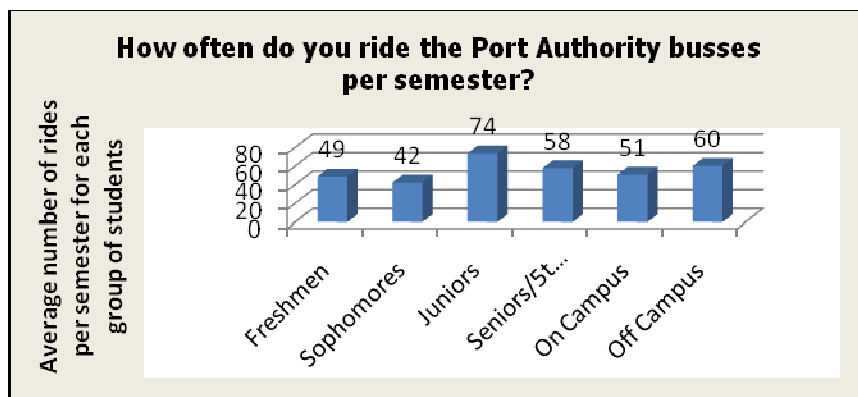
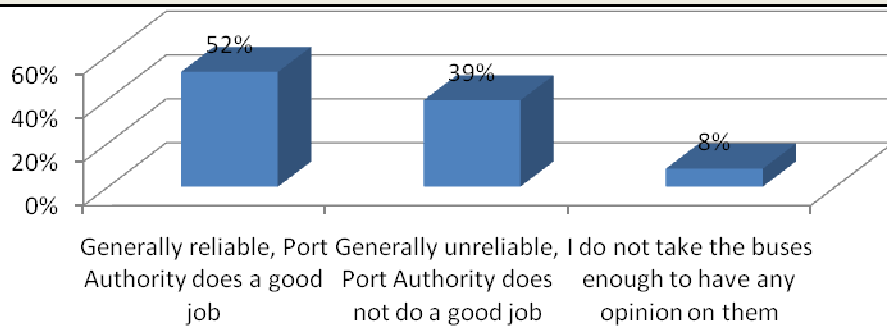


Chart 5:

Overall, what are your feelings toward the job that the Port Authority of Allegheny County does regarding bus service?



Media Fee:

Chart 6:

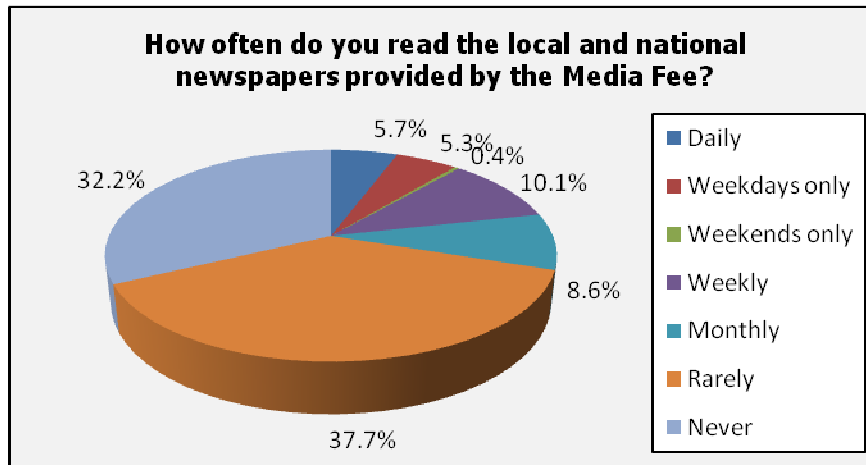


Chart7:

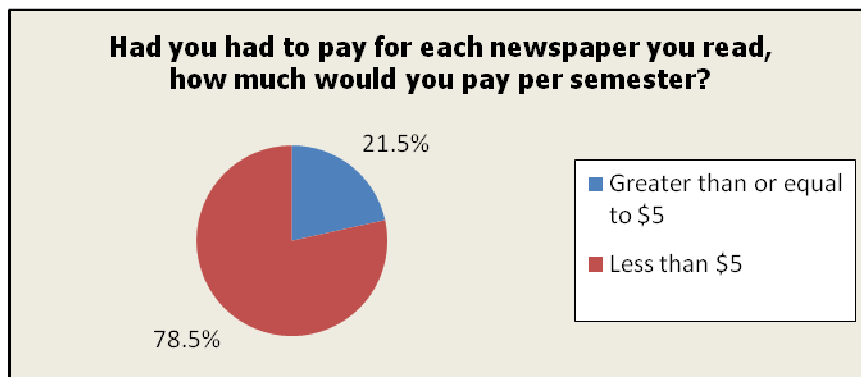
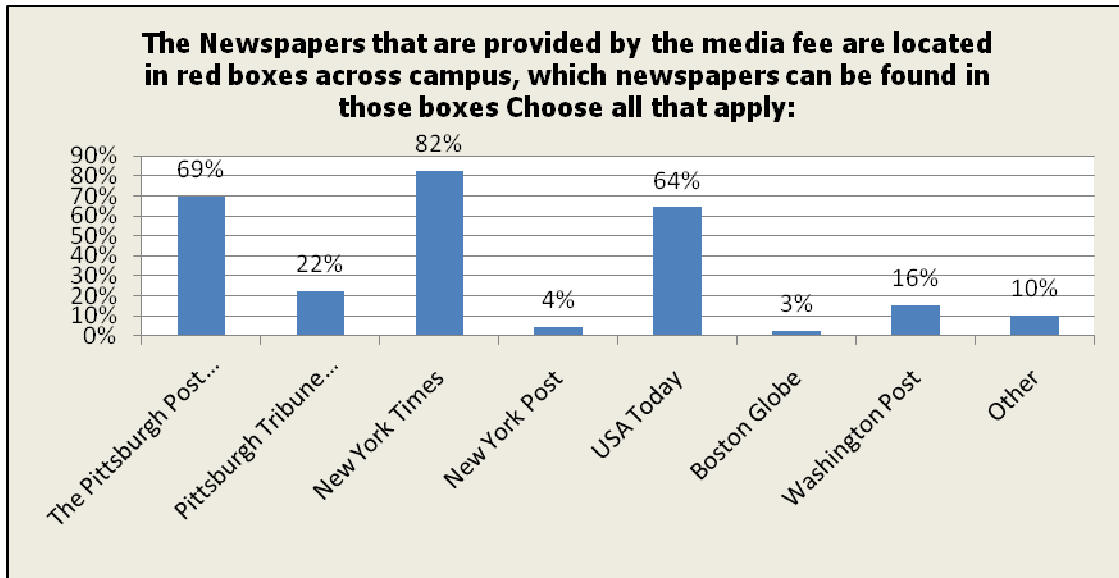


Chart 8:



Technology Fee:

Chart 9:

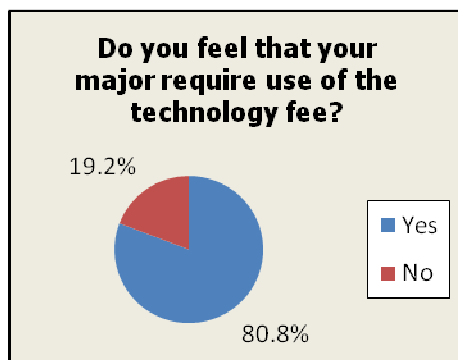


Chart 10:

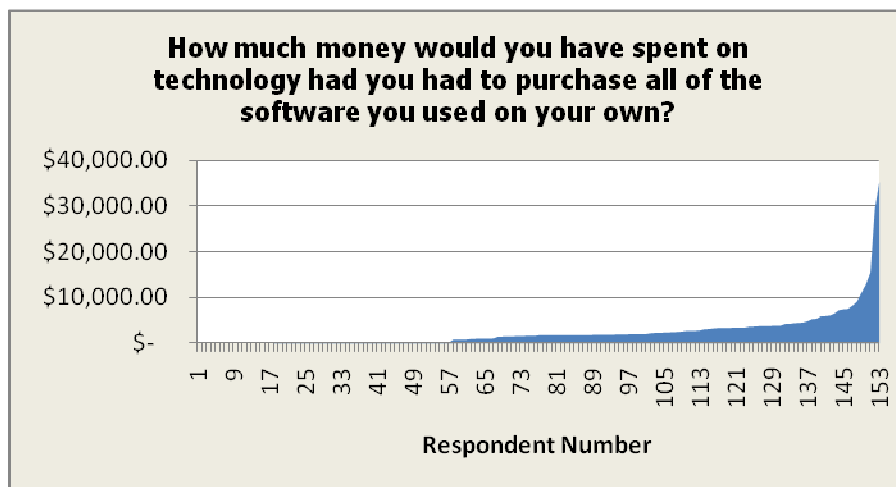
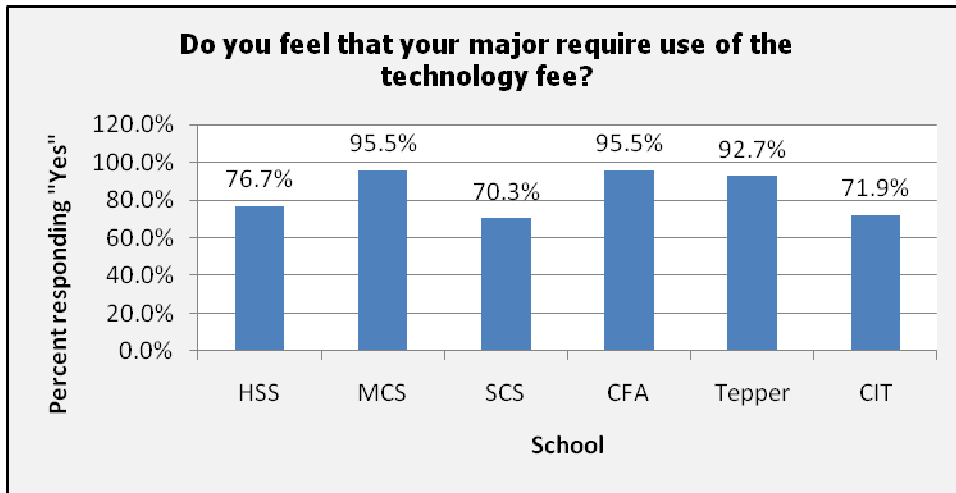


Chart 11:



Student Activities Fee:

Chart 12:

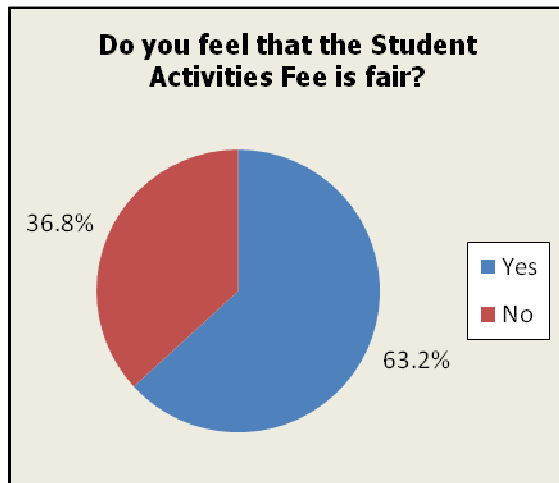


Chart 13:

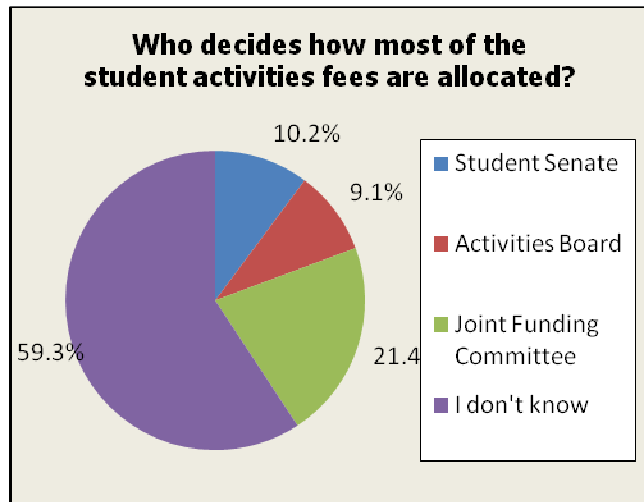


Chart 14:

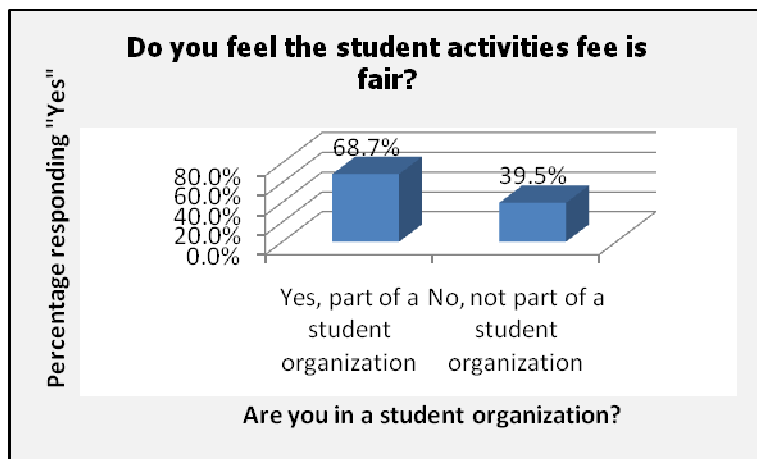


Chart 15:

