A RECRUITING ANALYSIS FOR THE KANSAS STATE COLLEGE OF ENGINEERING: THE FINANCIAL PERSPECTIVE

by

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Abstract Page

This report, "A Recruiting Analysis for the Kansas State College of Engineering: The Financial Prospective," is an initial baseline report that measures the effectiveness of KSU COE recruiting. This analysis examines the financial factor, or how students pay for their education. Specifically, the report examines the current students in the KSU COE and how they pay for their education and then compares the information to how college students pay for their education on a national level which is outlined in a report, "How America Pays For College", by Sallie Mae using research conducted by Gallup. Next, the report examines the reasons the current students in the KSU COE came to Manhattan to study engineering, emphasizing their geographic background as well.

The results found were that more students in the KSU COE borrow funds to pay for their college education than college students on a national level. Fewer students in the KSU COE or their parents solely pay for their college education when compared to students on the national level.

To gather information on how the students in the KSU COE pay for their education, 89 current students in the KSU COE were surveyed. The students were fourth and fifth year students having a high probability of finishing their degree programs than first year students. After gathering data on how this sample of 89 students paid for their education, using statistical theory, conclusions on how all the current students in the KSU COE pay for their education were made. These conclusions are compared to the payment methods for the students in the national sample.

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1.0 Introduction

1.1 Why is a Recruiting Analysis Important to the Kansas State University College of Engineering?

Kansas State University (KSU COE) needs to know how it promotes itself to prospective students and what kind of students they are attracting to improve recruiting methods. According to the Dean of Student Life, Dr. Pat Bosco, Kansas State University (KSU) has always been known to many people as an accessible university. (Bosco, 2008) By this, he means the administrators and faculty take the time to get to know the students and help them to be successful in their degree programs.   A result of this collaboration creates a family-like atmosphere. Many people, including Dr. Bosco, refer to KSU as a second home with an extended family. The KSU COE and the people associated with the college are similar.

According to the Assistant Dean of the KSU COE, Tom Roberts, P.E., KSU College of Engineering, KSU COE, has always marketed itself as having the most comprehensive engineering program in the Midwest, if not the country. Overall, the academic program is excellent, and job placement after graduation is always high. According to Tom Roberts, employers from industry will come back to KSU COE and hire our graduates because the academic programs prepare our graduates to be successful in industry. (Roberts, 2009) When determining why students come to KSU COE, the financial component of paying for college is important. To understand this financial component several factors need to be considered, such as (1) the perception of KSU COE to prospective students, (2) the knowledge base of prospective students on the degrees offered in KSU COE, (3) the opportunities available to them at KSU, and (4) their familiarity with KSU or KSU COE. This report starts to examine the different reasons why prospective students decide to come to KSU and study engineering.

Several factors could influence prospective students to study engineering at KSU:
- They believed they would be successful.
- They loved the atmosphere at the KSU when they visited.
- They were offered scholarships to go to KSU
- KSU was more affordable than another school.
- A family member had gone to KSU and received a degree.
- Educational background influenced the student come from.
- They came from a college preparatory high school.
- They are from an urban setting.
- They are from a rural setting.

Asking students why they came to KSU and what their background is will yield many different answers and should give insight to how the KSU COE promotes itself to prospective students. Knowing what kind of students the COE is drawing should improve recruiting methods leading to more students coming into the COE, which generates revenue. In turn, more revenue leads to more activities and opportunities for these students.

The purpose of this report is to study one component, finances, of how effective the recruiting methods are for the students in KSU COE. To examine finances, the background of the current students in the KSU COE and how they pay for their college education is reviewed. Specifically, a sample of 89 senior students from a fluid mechanics class in the KSU COE was surveyed to find out how they pay for their education and their background information. These students were targeted because they had almost completed their engineering degree and could give accurate data on how they pay for their education. These students surveyed were all fourth or fifth year students in the KSU COE. This sample of students could give the most accurate representation of how current KSU COE students pay for their education because all these students surveyed were very close to completing their degree. Had the sample been of first, second or third year students, the probability that the students surveyed which would finish their degree in engineering is less than that for the fourth and fifth year students and may give a false indication of how the successful (students who complete their engineering degree) KSU COE students pay for their education. Once the data was gathered from the test group, generalizations were drawn about how all the students in the KSU COE pay for their education using statistical methods. Ultimately, the research findings are to serve as a baseline for understanding how successful students in the KSU COE pay for their college education which may improve the recruiting practices by the KSU COE.

1.2 How Does the College of Engineering Promote Itself Now?

To perform a proper analysis of the recruiting practices of the KSU COE, the present perceptions of the college members need to be known. According to Tom Roberts, the KSU COE tries to get their name out to high schools and college prospective students by using current KSU COE students as recruiters and holding events on campus that bring prospective students here. (Roberts, 2009) In particular, the COE sponsors Engineering Ambassadors to go out to high schools and promote KSU and its engineering programs. This group is specifically designed so that high school students can get some face-to-face time with a representative from KSU who is current engineering student. The ambassadors focus on the engineering profession and KSU, but they also address the student's transition between high school and college. This personalizes the college decision-making process and lets high school students

hear and see real life success stories. These ambassadors indirectly show these students that KSU wants them to be successful in college by going to talk with them and explaining how to perform well in the classroom and how to have a successful college experience. Since every Ambassador was at one time a college prospective student, each one can connect with these students by telling their personal story.

The COE and KSU also sponsors Open House in the spring during which, every department in the COE has displays set up so visitors, including prospective students, can walk by and see what each department specializes in. For every major in the college, up to 55 student professional societies go on display during Open House. According to Tom Roberts, just like with Engineering Ambassadors, the main idea of Open House is to get more face time with college prospectives and actually show them what engineers do. (Roberts, 2009)

The Dean's Office in KSU COE counts how many Ambassadors visit high schools in a year, how many people come to KSU Open House and how effective these efforts are: How influential was that time with the Ambassador or that time on campus for Open House to the college decision-making process? Was it the main reason prospective students wanted to come to KSU, or was there another reason? According to Tom Roberts, no statistics have been gathered nor has a study been done to determine why students come to KSU and study engineering. If the COE doesn't know why students come here, how can we know the recruiting methods in KSU COE are effective? (Roberts, 2009)

1.3 Three Main Factors of Analysis (Finances, Perceptions, and Possibility of Success)

Students consider many variables when deciding where to attend college, enabling numerous studies about their selection habits. For this report, on the suggestion of Dr. John English, Dean of the KSU COE, this report touches on three main variables: finances, perceptions, and the likelihood of succeeding in the KSU COE. The main focus of the report is finances.

Concerning finances, research will focus on how affordable an undergraduate engineering education is at KSU. Based on the following factors:
- The affordability of one college compared to another
- The number of scholarships offered per university
- The number of students who solely pay for their education
- The number of students whose parents solely pay for their education
- The number of students who split the cost of their education with their parent

The second variable is perceptions and concerns the following issues:

- How a prospective student feels about one university compared to another
- The opportunities and student activities available per university
- The recruiters who visited the prospective student's high school
- Prospective student's level of comfort at one university compared to another

"If these prospective students don't feel comfortable, it doesn't matter the student's major of interest, the chances of succeeding at KSU significantly decrease.", according to Dr. Pat Bosco. (Bosco, 2009) Every student also needs to feel comfortable with the learning environment according to the article, "The Relationships between Students' Conceptions of Learning Engineering and their Preferences for Classroom and Laboratory Learning Environments." (Lin, Chia-Ching., Tsai, Chin-Chung, 2009) These prospective students need to know their learning style will be accepted at KSU by students and professors.

Finally, financial and perception variables influence the student's likelihood of success, which is based on the following issues:

- Coming to a university, performing well in the classroom and getting involved with rewarding activities
- Having a degree that gives a foundation for a great career
- Receiving help from professors and advisors
- Gaining the skills they need to be successful in the work force upon graduation

These are the issues that help determine the student's possibility of success according to Dr. John English. (English, 2009)

The three factors mentioned above are all-important to the recruiting process of the KSU COE. However, this report only focuses on the financial factor of the current students in the COE. If the KSU COE presents how the current KSU COE students are paying for their education, the prospective students can see the multiple ways of financing their own KSU COE education. The intent of this report is to give an initial base to further analysis of KSU COE recruiting.

1.4 Data Gathering for the Recruiting Analysis

To analyze the recruiting effectiveness of the KSU COE, a questionnaire was given to a sample of 89 fourth or fifth year students in the KSU COE. The students had to answer the following questions about how they financed their college education:

1. Are you solely paying for your college tuition?
2. Are your parents solely paying for your college tuition?
3. Are you and your parents dividing the cost of the college tuition?

4. Are you using any type of student loans/grants?
5. Were you offered any scholarships to come to K-State?
   o If yes, please specify which.
   o Are any of the scholarships from the College of Engineering?
6. If you answered no to questions 1, 2, and 3 and do not have any scholarships or student loans, how is your tuition being paid for?

The purpose of questions one through six was to obtain information on how students in the COE pay for their education. This information could generate a general break down of how all the students in the COE are paying their college expenses.

7. Did you find studying engineering at KSU to be more affordable than other universities when you were exploring colleges?
   o If yes, please specify which.

This question was intended to gather some information on what other colleges and universities the students in the COE explored when they were deciding where to go to college. It also was intended to show how KSU COE compared to other schools in terms of college tuition at the time these students were choosing a college.

The next series of questions addressed personal background information:
8. Were you the first person in your family to go to college?
   o If no, who in your family has gone to college and received a degree?
- Were the academic programs offered by the College of Engineering the main reason you came to K-State?
  o If no, what was the biggest reason?
- Did you transfer to KSU from a Community college?
  o If yes, what community college was it?
- If you attended community college, why did you start there?
- What high school did you attend and where is it located?

Questions eight through twelve were intended to find out whether the current students are from a rural area, small town, or an urban suburb and in doing so reference how large their high schools are. These questions also address the main reason these students chose to come to KSU and if one main reason stands out. The students were also asked if they started at community college and their reasons for this, to get an idea how many students in the KSU COE typically transfer in from community colleges. Question eight was to determine how many

students in this sample were the first to go to college in their family, and if a parent getting a college education means their children will be more likely to go to college. The results of this question also help determine the sample student's maturity. According to, "The Relationships between Students' Conceptions of Learning Engineering and their Preferences for Classroom and Laboratory Learning Environments," (Lin, Chia-Ching., Tsai, Chin-Chung, 2009) the learning objective changes as student maturity increases. For instance, if a student wants to learn to further his or her own knowledge and is not primarily set on making the best exam scores, that student is known to have a higher level of student maturity.

Some information that was not gathered from the students included the following:
- Engineering department
- Student demographics
- Gender

While this report did not focus on the three factors mentioned above, these factors may have an impact on how a student pays for their education and future research in this area should be done. This report is a recruiting baseline for financial implications.

1.5 Report Layout

This report is organized to show how students in the KSU COE pay for their education as well as to show the demographic and personal background of the current students.

Following the Executive Summary, Seciton 2.0, section *3.0 How America Pays for College* (SallieMae, 2008) is referenced directly from national surveys conducted by both Sallie Mae and by Gallup. These two companies put their findings together in a report called, "How America Pays for College."

Sallie Mae is a leading provider of programs for saving and paying for college, which helps many people fund their college education. The company handles roughly $170 billion in education loans and serves around 10 million students and parents. Along with being one of the major private sources of college funding, Sallie Mae also partners with other loan companies to manage more than $19 billion in over 500 college-savings plans. Meanwhile, Gallup has studied human behavior for over 70 years by gathering data and delivering research on how people think and feel. This organization has researchers in economics, management, sociology, and psychology. Additionally, Gallup consultants assist leaders of companies by monitoring economic trends.

In the report, "How America Pays for College," the data reflects the attitudes, aptitudes, and actual experiences of students paying for college. To gather this data, Gallup interviewed 684 college-going students and 720 parents of students aged 18-24. This study was to serve as a baseline to measure the ability of American families to pay for college.

For this study, the report yielded the national averages of how college students across the country pay for their education, which was then compared to how the students in KSU COE pay for their education in section *4.0 How do Students in the Kansas State University College of Engineering Pay for Their Education?* This section also explains the reasons for the similarities and differences in tuition methods among the students in the national survey and those in the KSU COE.

Section 5.0 Current Student Background Information in the Kansas State University College of Engineering discusses the personal and demographic backgrounds of the current students in KSU COE. This section shows student distribution, how large their high school is, whether these students' parents had a college education, and students' reasons for coming to Kansas State University.

Section 6.0 Student and Parent Attitudes About College Spending is the final section of this report and is based on information taken from the Sallie Mae report showing the specific student and parent attitudes of how and why college is an important investment. This section uses many statements measuring the students' and parents' perceptions about spending money for college. Similar results from the national report, "How America Pays For College," are then compared to the reasons current students came to the KSU COE to determine any correlations.

2.0 Executive Summary

The first part of this report discussed how students across the nation were paying for college and later how current students in the KSU COE pay for their education. These two student groups were then compared to show how the students in the KSU COE compare to students across the nation regarding tuition payment.

The SallieMae/Gallup report showed six different methods of payment for students across the nation. These payment methods are
- Grants/Scholarships

- Student Income and Savings
- Friends and Relative Support
- Parent Income and Savings
- Parent Borrowing
- Student Borrowing

According to this report and *Chart-3-1*, most college students across the nation are funded through parent income and savings at 32%. The second most popular method of payment was student borrowing at 23%, which was followed by parental borrowing at 16%. The fourth most frequent method of payment was student income and savings at 10%. The final 18% of students surveyed paid either by grants or scholarships 15%, or with friends and relatives support at 3%.

The Sallie Mae report also broke down all the individual payment categories to specifically how payments are made. For instance, for the 32% of families that pay by parental income and savings, a majority paid for their child's education with their current income (19%). Other methods of parental spending were through two types of savings accounts. For the remaining 12% who paid by parental income and savings, 6% used a college savings plan, and the other 6% used some other type of savings plan.

For the next payment category of parental borrowing used by 16% of the sample, many of these parents, 5%, used the federal PLUS loan or some other type of loan to cover tuition, 4%. Some other parents filed a home equity loan, 3%, while a few select parents paid for college tuition by credit card, 1%, or by withdrawing funds from their retirement account, 1%.

For the 23% who paid by student borrowing, most of these students used federal student loans, 12%. Other students used a private education loan at 5% or another type of loan at 5%. A few students selected to use a credit card to pay for tuition at 1%.

For the payment method of student income and savings, most of these students paid through a savings account, 4%, or by current income, 4%. Other students in this group paid tuition by some other method, 1%, or through some federal work study program, 1%.

The report also discussed how family income has an impact on how a given family pays for college. Taking six payment categories and correlating them to three income brackets:
- $0-50,000
- $50,000-100,000

- $100,000 and Above

For the lower income bracket, the most popular methods of paying for college tuition were through grants, $3890, and scholarships and student borrowing, $3900. These two payment methods were the highest for this lower income bracket when compared to the middle and the higher income bracket. Many times, the students in this lower income bracket come from families who cannot afford college tuition, so they either receive many scholarships or are forced to take out student loans to cover tuition. For the other payment methods, roughly the same amount came from parent borrowing, $2390, and parent spending, $2680. Finally, the amount paid by friends and relatives support was $490.

In the middle income bracket, the most popular methods of tuition payment are parent income and savings at $4,340 or student borrowing, $4980. The increase in the parent income and savings is an indication that parents in the middle income bracket are more able to afford tuition than those in the lower income bracket. Concerning student borrowing being so high here, the students in the middle income bracket might want to go to a prestigious school that those in the lower income bracket could not, so they would be forced to take out student loans of some kind to cover tuition. This income bracket also accounted for relatively the same amount of money in the categories of grants and scholarships, $2310, student income and savings, $2020 and parent borrowing, $2480. This shows that what isn't paid for through parent income or savings or from a student borrowing funds, gets picked up in the remaining three categories. Friends and relatives support was a low number here as well, at a value of $780.

The highest income bracket here accounted for the most money spent in the parent income and savings category at $11410. This shows that such parents are able to cover much more of the tuition cost than those in the lower income brackets. The second two most popular methods of payment for this group were parent borrowing, $3070 and student borrowing, $3710, which were followed by grants and scholarships $1260 and student income and savings, $1100.

The cost of attending college for all these income brackets was described as well in, "How America Pays For College." For overall spending on a college education, the report showed that the higher income bracket spent the most at $38,234 while the middle income bracket spent the least at $24,897 and the middle income bracket spent an amount in between the others at $13,772. The reason these higher income bracket families spent more is that they are used to spending and can afford to do it. The reason the middle income bracket was lower is that they

might not be able to spend the amount of money the higher income bracket can. The lower income bracket spends the second highest amount because they need to pay more towards college tuition than the middle income bracket.

The next section of this report focuses on how the current students in the KSU COE pay for their education. Accordingly, a sample of 89 fourth and fifth year college students was given a questionnaire, and they answered questions about how they pay for college as well as their personal background.

The students were asked the following financial questions:

- Are you solely paying for your college tuition?
- Are your parents solely paying for your college tuition?
- Are you and your parents dividing the costs of your college tuition?
- Are you using any type of student loans or grants?
- Were you offered any scholarships to come to K-State?
    - If yes, please specify which.
    - Are any of the scholarships from the College of Engineering?
- If you answered no to questions 1, 2, and 3 and do not have any scholarships or student loans, how is your tuition being paid for?
- When you were exploring colleges, did you find studying engineering at KSU to be more affordable than at other universities?

Given the responses to these questions, very few of the students in the KSU COE are funding their own education (6%). This is simply because the burden of paying the full cost of tuition is too much for student finances, and they need help from their parents or some type of student loan. Compared to the national percentage of students who fund their own education, 10%, it is slightly lower. The lower percentage of students in the KSU COE funding their education themselves could be indicative of their class placement; meaning 4th and 5th year students might not have the money they did their freshman year of college.

 A greater portion of the students sampled, 22% have their parents cover the cost for their education. Clearly, these parents who solely pay for their child's tuition can afford to do so. Compared to the national percentage of 32%, this percentage is also lower; again, possibly indicative of the student's class placement and the amount of funds they have available to them.

A small sample, 12%, split their tuition cost with their parents because neither the parent nor the student could solely pay for it. They either have a choice of splitting the tuition bills or taking out a loan to pay for school. This could not be compared to any percentage from the national survey because the national report didn't specific the number of students who pay by this method.

 A majority of the students in the college of engineering are using some type of student loan to pay for their education. The results of the questionnaire and statistics show about 60% of the students in the COE are using student loans. Many of these students do not have the finances to cover the cost of tuition themselves and neither can their parents, so the only option left is to take out a student loan. Again, many of these students might require loans because they are fourth and fifth year college students. A fourth year college student has already invested a lot of money into a college education might run out of funds so loans are necessary to cover tuition. Comparing this sample to the national average, the 60% is greater than the number of students in the national survey who borrowed funds or whose parents borrowed funds to pay for college, 39%. This could be indicative of the student sample's class placement, and the fact they attended a four year university and representing their family income level.

Fortunately for these 89 students, 103 scholarships are distributed amongst them. Now, these scholarships don't cover the entire cost of tuition, but they lower the tuition cost a little. The complete list of student scholarships is listed in section 4.0 of this report.

The students were also asked to compare the cost of an undergraduate engineering education at KSU to that of any other school when they were visiting colleges. For these students, studying engineering at KSU was more affordable than the following schools:

- The University of Missouri
- The University of Kansas
- The University of Missouri-Rolla
- Iowa State University
- Washburn University
- Colorado School of the Mines
- Wichita State University
- Louisiana Tech University
- The University of Nebraska

For those students who said Kansas Sate was more affordable than these other schools, only 34 said they came to the KSU COE because it was more affordable. Such reasons are described in a later in section 5.0.

The next section of the questionnaire addressed the personal background of each of the students:

- Are you the first person in your family to go to college?
    - If no, who in your family has gone to college and received a degree?
- Were the academic programs offered by the College of Engineering the main reason you came to K-State?
    - If no, what was the biggest reason?
- Did you transfer to KSU From a Community college?
    - If yes, what community college was it?
- If you attended community college, why did you start there?
- What high school did you go to, and where is it located?

These questions were intended to get an idea of what kind of students the KSU COE brings in currently. Therefore, these questions address whether students have college educated parents, the size of their high school, and if they are from an urban or rural area. It also addresses the main reason these students came to the KSU COE. One final topic addressed in these questions is whether these students started at community college and if so, why.

Responses to the first question show 70 of these students are non-first generation college students, meaning that these students have parents who are college-educated. The other 19 students in this sample are first generation college students. Clearly, if students had a college-educated parent, they were more likely to attend college.

The next section asked the students their reasons for coming to the KSU COE specifically on the academic programs. Apparently, 60% of the students said the academic programs in the KSU COE were the reason they came to Manhattan. Other reasons students came to K-State included such elements as the general atmosphere, meaning that the students commented how they liked the way people treated them when they visited campus and how accessible everything was compared to other universities they visited. Many students also said there were numerous activities to be involved in, which enhanced the general atmosphere. In fact, 30% of the students said the general atmosphere was their reason for coming to KSU, while 5% of these students had a family member attend KSU and had a successful college experience,

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and that's why they came. The final 5% of these students said the sports programs were their reasons for becoming Wildcats.

Only 5 out of 89 students said they transferred into the KSU COE from a community college; their reasons for going to community college included the smaller class sizes were smaller and that their high school counselor recommended it. One student wanted to keep playing sports and was offered a scholarship to play at a community college. Another student participated in a high school program that was set up to get the first two years free at a community college. One of these students mentioned the atmosphere of the big school being too much for them as a reason they started in community college.

Next a majority of students from Kansas attended high schools from a mix of rural areas and large suburbs. The high schools these students attended as well as the 2000 census populations of these areas are listed in the report. What this shows is no matter how big the city, if a university has a good academic reputation like KSU and is accessible to everyone; prospective students will be drawn to go to school there.

For the out-of-state students currently in the KSU College of Engineering, a similar trend was found. All of these out-of-state students came from a large urban area. This shows that out-of-state recruiting at the KSU COE is mainly focused on large cities.

The final section of this report draws from the Sallie Mae report, "How America Pays For College," and discusses the perceptions of students and parents on investing in college

The parents and the students were given series of statements, which they were asked to respond to:
- Strongly Agree
- Agree
- In Between
- Disagree
- Strongly Disagree

The statements given to the students are shown below:

- I am willing to stretch myself financially to obtain the best opportunity for my future.
- I'd rather borrow money to go to college than not go at all.
- College is definitely worth the cost.

- College is an investment in my future.

The parents were given the following statements:
- I am willing to stretch myself to provide the best opportunity for my child.
- I would rather borrow to pay for college than have my child not go at all.
- Students should pay their own way through school.
- I let my child choose the college he or she wanted and did not discourage choices based on cost.
- For my family, community college is a more attractive higher education.
- College is definitely worth the cost.
- College is not affordable for my family.
- Saving for retirement is more important than paying for my child's college education option.
- College is an Investment in my child's future.
- Assisting my aging parents financially has reduced my ability to pay for my child's college education.

What is common to the responses for all these statements is that consistently both students and parents feel college is a worthwhile investment in the future. The parents and the students both had a significant "strongly agree" response to college being worth the cost and an investment in the future. Similarly, the parents and the students agreed that borrowing for college was better than not being able to go at all. Both parties also said they would be willing to stretch themselves financially to have the opportunity to go to college or for their son or daughter to go to college.

Specifically for the parents, assisting their aging parents didn't seem to hurt the ability to pay for their child's education that much. Also, the parents surveyed said that paying for college was far more important than saving for retirement. Those few parents who said that saving for retirement were probably also some of these parents agreed that community college was a more affordable higher education option than a four year university.

3.0 How America Pays for College

In 2008 Gallup generated a report "How America Pays for College" based on a survey by SallieMae. The information shows on average how families across the nation pay for their college student's tuition. This report showed a national distribution of the different methods of

payment from scholarships/grants, student and parent borrowing, student and parent income and savings, and friends and relatives support.

Each method of payment is then broken up individually to show the different ways a college education was financed. The information from this section is compared in Section 4.0 to that for the current students in the KSU COE to see how those students compare nationally.

3.1 How Americans pay For College

To show how the KSU COE compares to the nation in paying for college, a baseline showing how students across the nation pay for college is presented. From *How America Pays for College,* an adapted pie chart of how Americans pay for their college education is shown in *Chart-3-1*. (SallieMae, 2008)
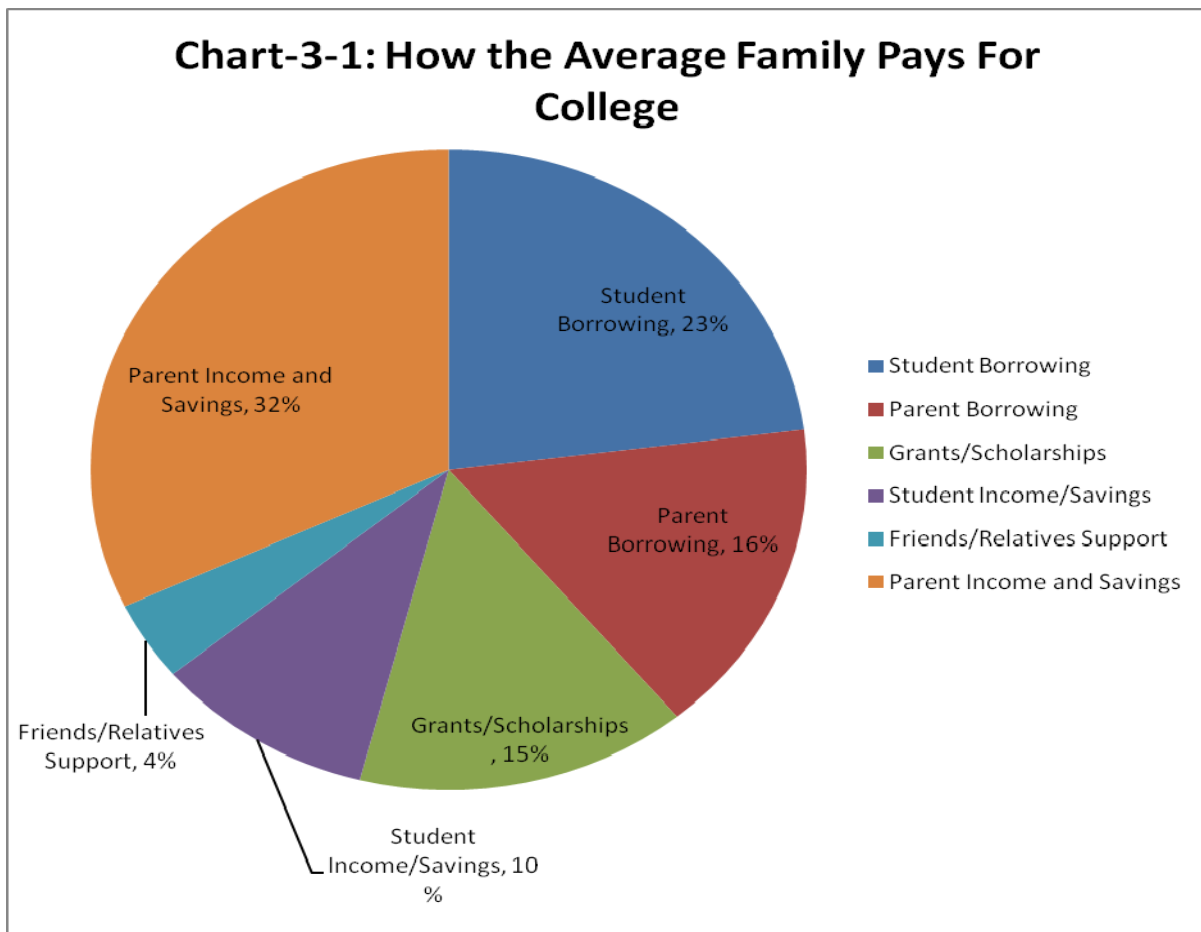
Chart-3-1: How the Average Family Pays For College (SallieMae, 2008)

Referencing *Chart-3-1: How the Average Family Pays For College*, most students are funded through college by their parents' income or savings (32%). In addition, 23% of families paid for college education by their student borrowing money. This means these students funded their education partly through their own savings and partly through federal student loans. Next, 16% of these families paid for college by parent borrowing, meaning that the parents paid for a portion of their student's college education with their own income or savings, and the student paid the remainder of the balance with some type of borrowed money such as federal student loans. Another 15 % of the students could pay for college through scholarships or grants that did not need to be repaid. The final 4% of the students paid for college through support by relatives and friends.

3.1.1 Parent Contribution From Income and Savings

Of the many students whose parents paid for college, most drew tuition from income rather than savings. *Graph-3-1: Parent Contribution From Income and Savings* indicates a distribution of the 32% of college students whose parents solely pay for college. Of the parents who pay for college, only 12% do it through a savings account. Half of these parents pay from a specified college account they had set up for their child, and the other half pay tuition from some other savings accounts. The other 19% of these parents pay for college with their current income.

One reason many of these parents are paying for their child's education with their current income is college tuition is an expense that is easier to take care of at the time rather than later. Families who have the funds prefer to pay for their child's tuition without borrowing money. Many college students had savings accounts set up at a very young age for college. Unfortunately, many times tuition proves to be higher than the amount in these savings accounts, and the parents are willing to pay for the remainder out of their income. Some families even consider it part of their spending. Some families maintain a budget such that if they have a college student, part of the parents' expenditures is paying for their education. (SallieMae, 2008)

If money needs to be borrowed, interest can accumulate and take a long time to pay off. According to, "How America Pays for College," many families and college students would prefer financial freedom from loans and credit cards. Fortunately, for approximately 32% of the college students in America, their parents can pay for their education.
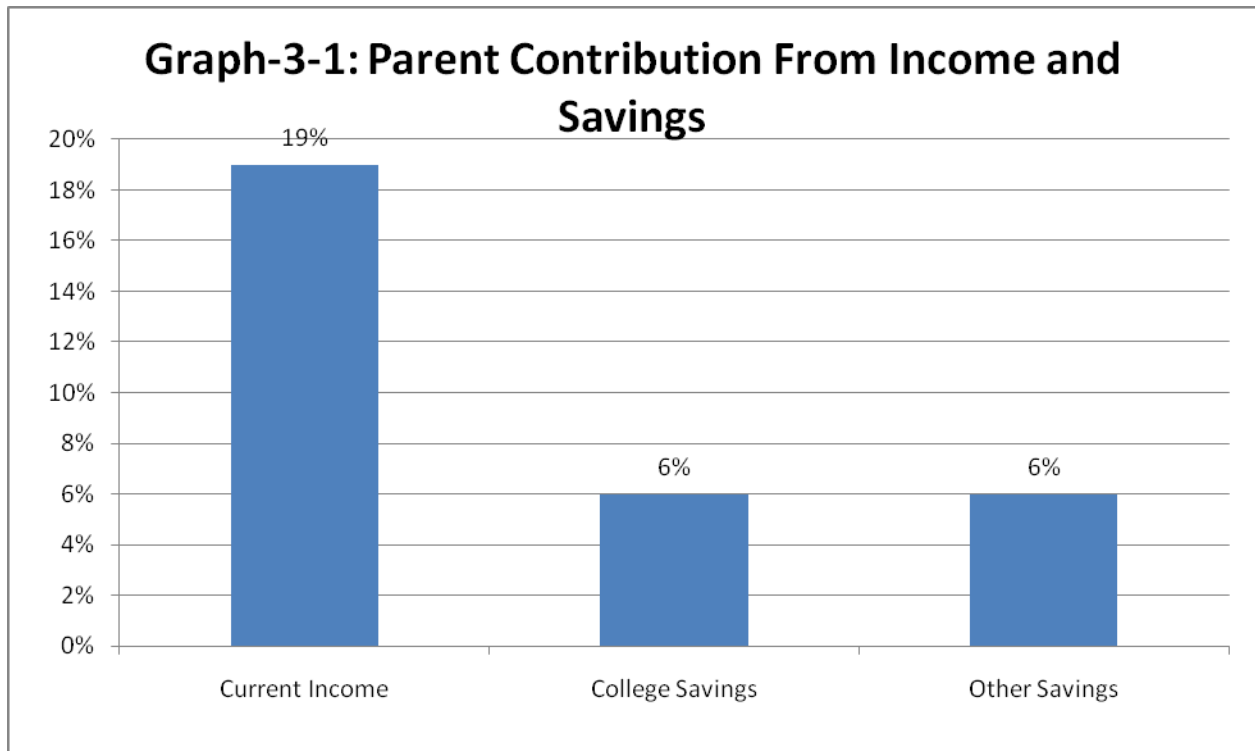
Graph-3-1: Parent Contribution From Income and Savings (SallieMae, 2008)

3.1.2 Parental Borrowing

Referencing *Graph-4-2: Parent Contributions From Borrowed Sources*, for the 16% of the parents who borrowed to pay for their child's college tuition, 5% of the loans were federal student loans, 4% were another type of loan, 3% were home equity loans and, 2% were a private education loans. Only about 1% of these parents paid for their child's education through a retirement account or by using a credit card. (SallieMae, 2008)

It makes sense that a majority of parents who borrow take out some type of loan. If the parents cannot afford to pay for college all themselves and neither can their student, they must find some way to finance college education, and loans are a good option.
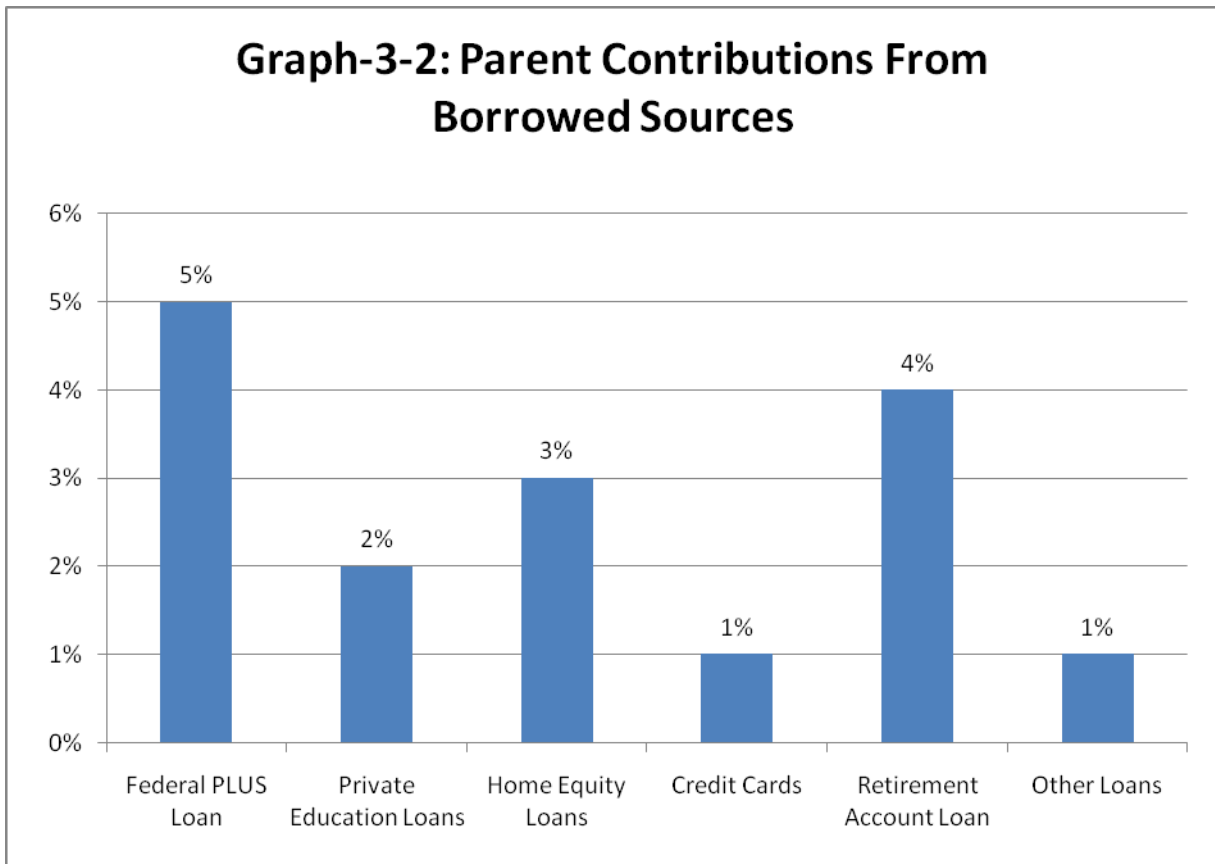
Graph-3-2: Parent Contributions From Borrowed Sources (SallieMae, 2008)

3.1.3 Student Borrowing

Of the 23% of college students who pay for their education by borrowing funds, a majority, 12%, used some type of federal student loans. Of this funding, 5% was through a private education loan made to students. Another 5% borrowed money from another type of loan. The final 1% used a credit card to fund their education. *Graph-3-3: Student Contribution From Borrowed Sources* this shows the distribution of how these students borrowed money. (SallieMae, 2008)

Students borrow money for college for many reasons. For example, many parents cannot afford to cover the full cost of college tuition while, some parents may not be able to cover the cost of tuition at all. The students are then left to cover a portion of the cost or all of the cost, usually in the form of loans or credit cards. (SallieMae, 2008)

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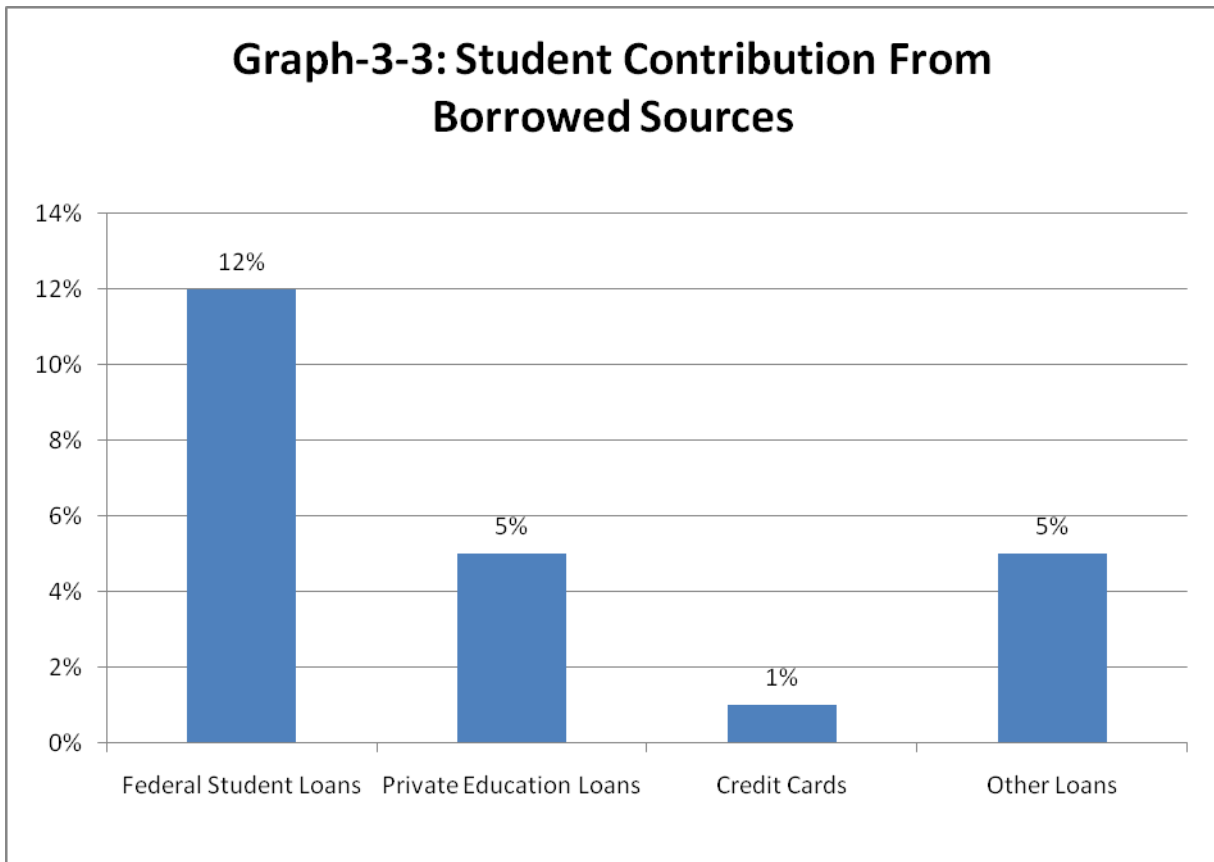
Graph-3-3: Student Contribution From Borrowed Sources (SallieMae, 2008)

3.1.4 Student Contribution from Income and Savings

Graph-3-4: Student Contribution From Income and Savings shows the distribution of how students funded their college education; 10% of college students pay for college themselves with their own income and savings. Compared to the 32% whose parents contributed income and savings to pay for college, the number of students who pay their full tuition is substantially less. Of these students, 4% pay for their tuition through their savings. 5% pay with their current income including Federal Work Study, and the remaining 1% pay tuition by some other method of payment. (SallieMae, 2008)
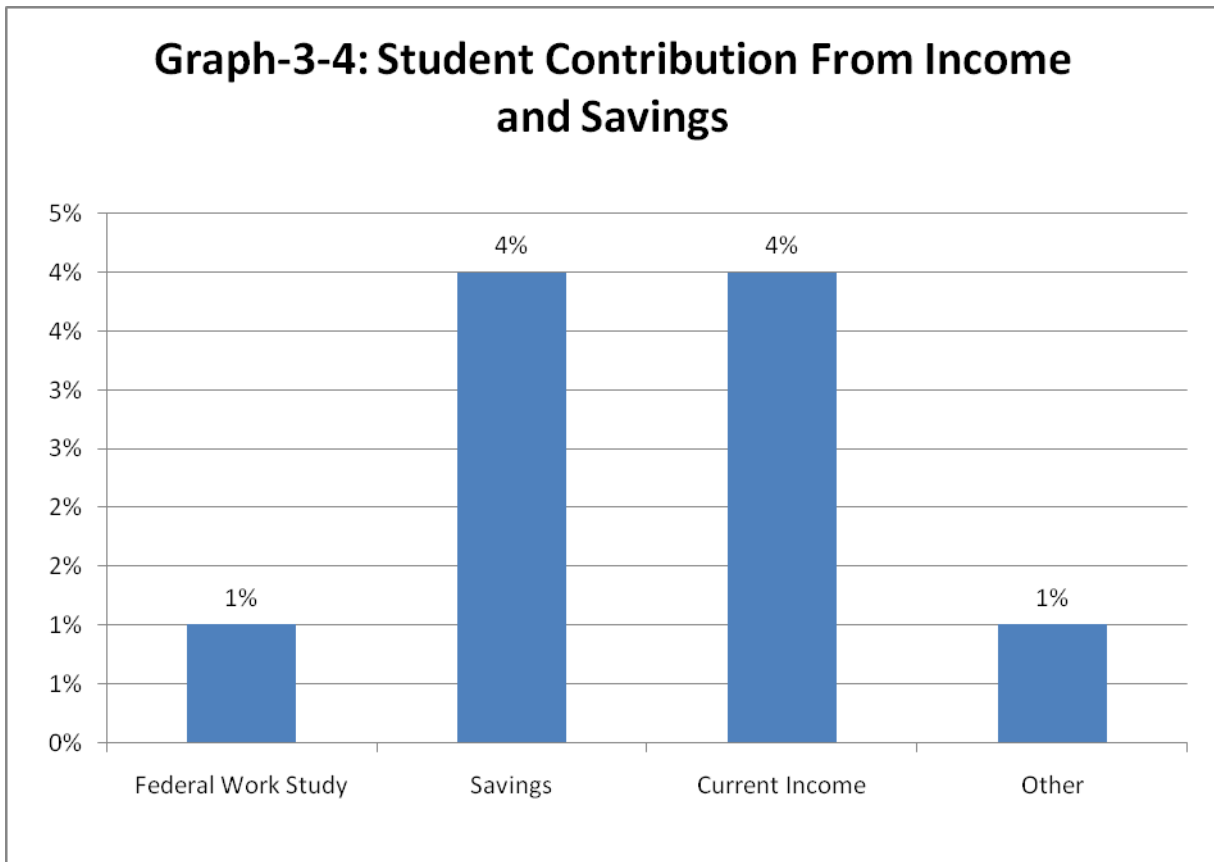
Graph-3-4: Student Contribution From Income and Savings (SallieMae, 2008)

3.2 Impact of Family Income on Paying for College Sources

Any family who has paid or is paying for college knows it is a major financial investment, and how much each family pays depends on the income level of that family. For instance, families on average reported spending more than $17,200 a year on college. For families with incomes above $100,000, the reported amount spent on college was $21,000. These families contributed a lot more to fund college in the "parents income and savings" category than those families below $100,000. (SallieMae, 2008)

The following sections take three levels of family income (1)$0-$50,000, (2)$50,000-$100,000, (3) $100, 000 and above, and discuss how each group pays for college using the six ways, ((1) Grants and Scholarships, (2) Student Income and Savings, (3) Friends and Relatives Support, (4) Parent Income and Savings, (5) Parent Borrowing, (6) Student Borrowing)

3.2.1 College Payment Based on Family Income of $0-$50,000

Graph-3-5: College Payment Based on Income of $0-$50,000 shows that a majority of the families with this income level paid for college through student borrowing or grants and scholarships. Typically, the amount paid with grants and scholarships was $3,890, and the amount that students borrowed was $3900. This goes to prove the earlier point that some parents or families alone can not pay for college tuition. As a result, the student must get funding from somewhere else, like a student loan, or be fortunate enough to have scholarships that cover tuition.

The amount allocated from student income and savings was on average $1780, and if the parent paid for college out of a savings account, that amount was $2680. For the other parents who borrowed money, they borrowed $2390. Some little percentage of tuition in this group was paid by friends or relatives to the amount of $490. (SallieMae, 2008)
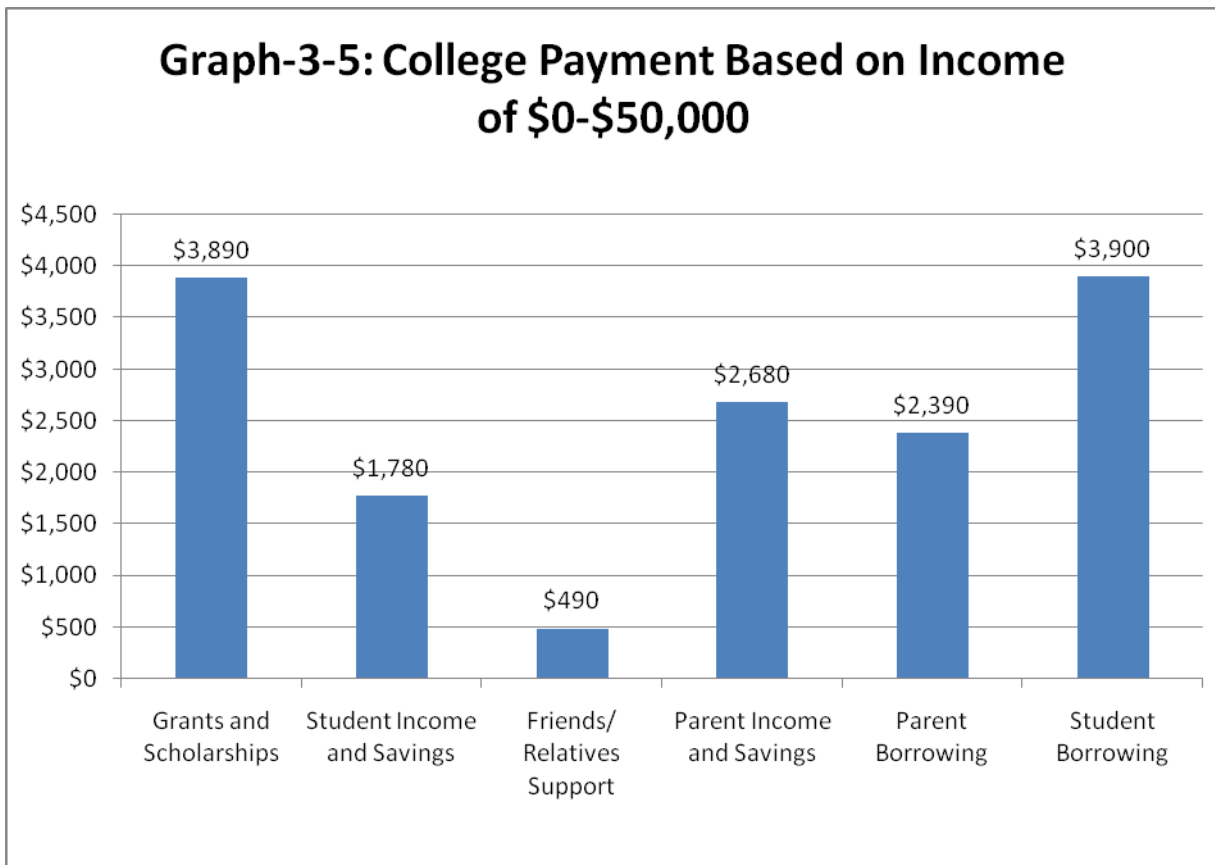
Graph-3-5: College Payment Based on Income of $0-$50,000 (SallieMae, 2008)

3.2.2 College Payment Based on Family Income of $50,000-$100,000

Graph-3-6: College Payment Based on Income of $50,000-$100,000 shows a majority of families in this range paid for college through either parent income and savings or student borrowing. More parents paid for their child's tuition in this income range than in the $0-$50,000 range. $4340 compared to $2680; it seems the jump in income range suggests more parents could cover the cost of tuition.

The amount students borrowed in this income range was $4980 compared to $3900 in the lower range. The reason for borrowing does not change from the previous income range in that parents cannot pay for tuition, and if the student does not have the savings, borrowing funds appears to be the only option. This increased amount of borrowed money could be the sign of attending a more expensive school, or maybe it's just for more spending; however, once a jump in the income range occurs, an increase in spending is likely to happen. (SallieMae, 2008)

Three other methods of payment in this income range were grants and scholarships ($2,310), student income and savings ($2,020), and parent borrowing ($2,480). The amount of student income and savings was slightly larger than in the previous income bracket for the same reasons as in the previous two categories, a higher income bracket means an increase in spending. The number of scholarships actually decreased for students in this higher income bracket, which is a good indicator that more scholarships are going to those students in lower income families. Finally, parent borrowing showed a slight increase from the previous bracket, probably for increased spending.
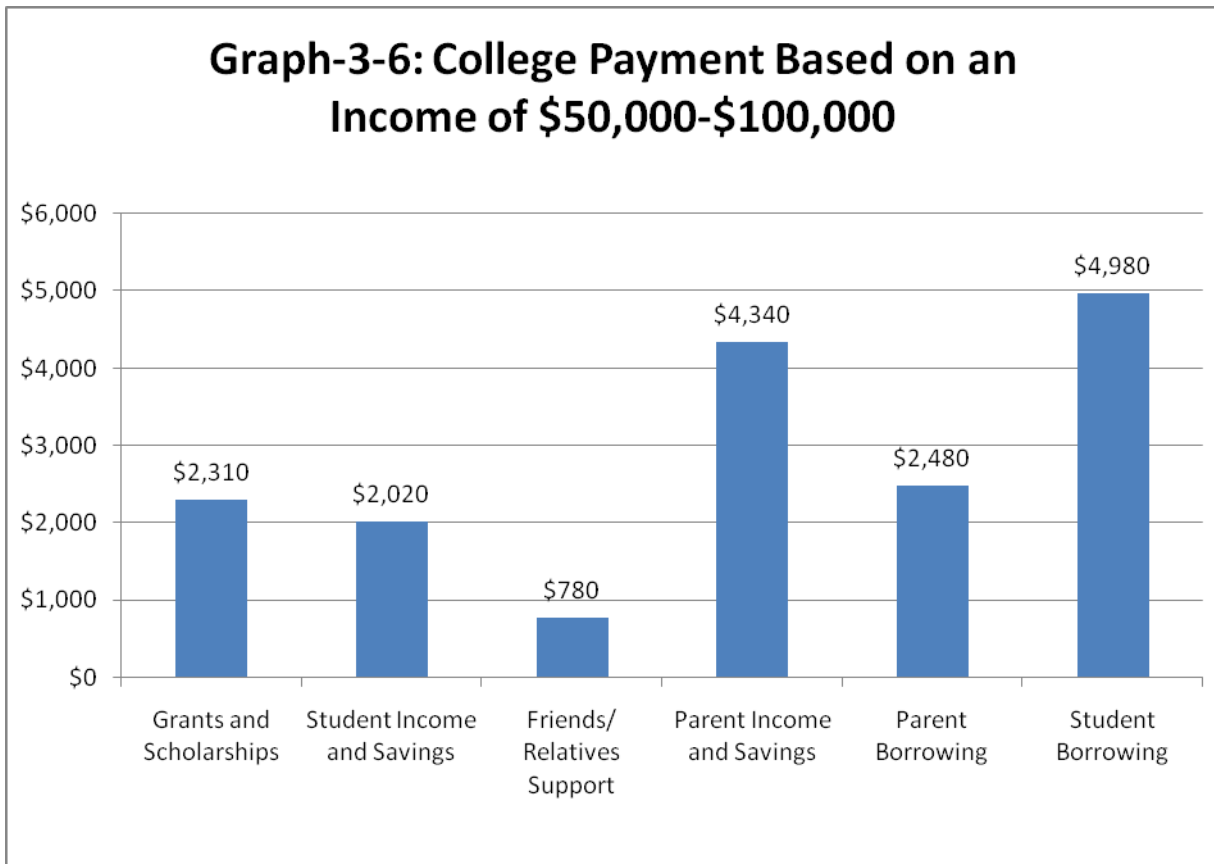
Graph-3-6: College Payment Based on an Income of $50,000-$100,000 (SallieMae, 2008)

3.2.3 College Payment Based on Family Income of $100,000 and Above

Graph-3-7: College Payment Based on an Income of $100,000 and Above, shows how members in the higher income bracket pay for college. A majority of the families in this group pay for college through parental income and savings. Thus again, if parents can cover the cost of college tuition, likely they will. Simply put, if the parents are in a higher income bracket like this one, it will be more feasible for them to cover the cost of college tuition.

From the *Graph-3-7*, the amount of money from parental income and savings is $11,410 on average. This is by far the greater amount than for the second highest method of payment of student borrowing, which is $3,710 in this income bracket. The amount of student borrowing is slightly down from that for the $50,000 to $100,000 income bracket and decreased from that for the $0-$50,000 bracket. A possible reason could be students had a little more money saved for college in the higher income bracket due to their parents' higher income.

The third highest method of payment was parent borrowing at $3,070, representing the greatest amount of parent borrowing of all three income brackets.

The lowest three methods of payment in this bracket were grants and scholarships ($1,260), student income and savings ($1,100), and friends and relative support ($490). Of the three income brackets, scholarships and grants is lowest for the higher income bracket. Given these numbers, it is a fair claim that the scholarships are going to the students of the families in the lower income bracket. The lowest amount of spending from student income and savings occurs in the higher income category. If a student's parents are in the higher income bracket, they will likely have to pay less money for their college education. The final category is friends and relatives support, whose data is relatively low for this category as with the other two income brackets.
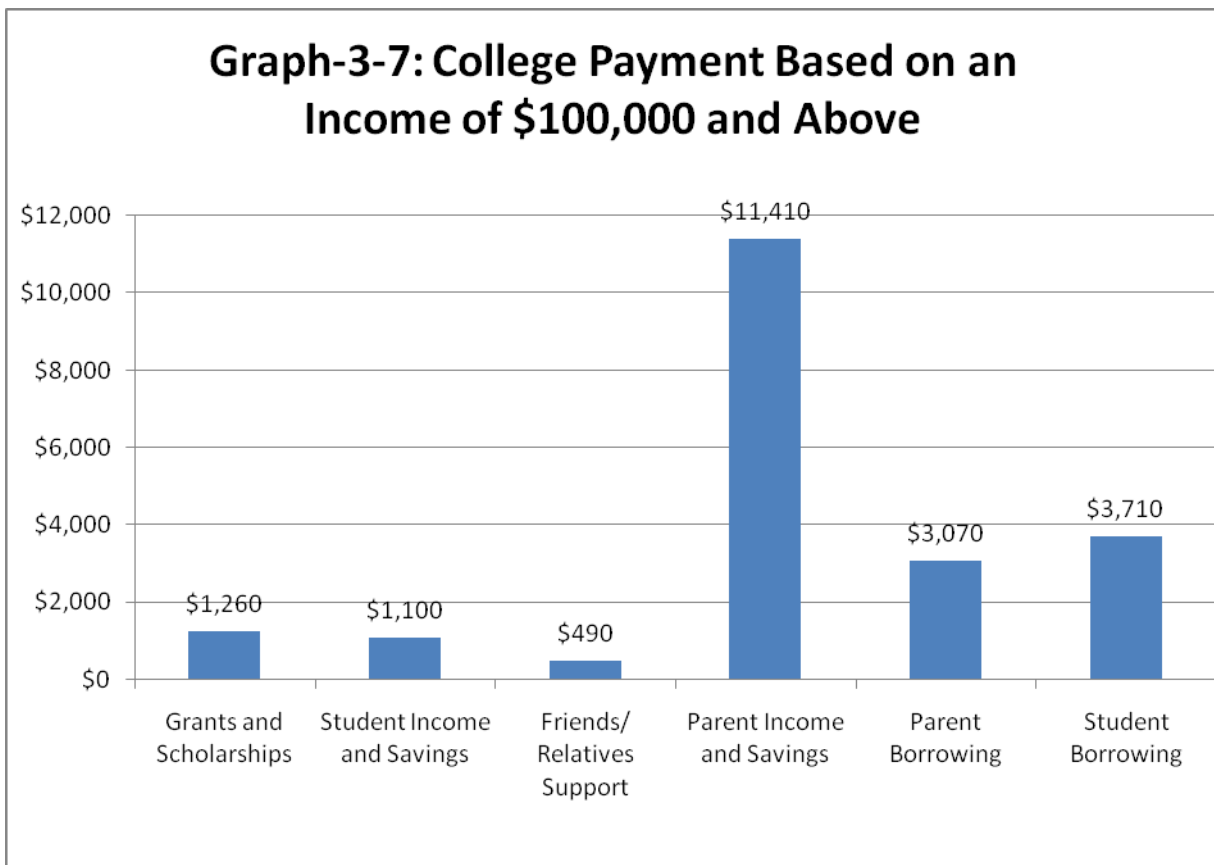
Graph-3-7: College Payment Based on an Income of $100,000 and Above (SallieMae, 2008)

3.2.4 Summary of College Payment Sources

Some obvious trends exist in the distribution of college payments from all the income brackets.

In the lowest income bracket, a lot of money was spent in the form of student borrowing and in the grants and scholarships categories. This probably happens for two reasons. These families can not afford the full cost of college tuition so their students are forced to borrow funds or get scholarships or grants. Notably, the scholarships and grants amount is the highest in the lower income bracket. This is a very strong indication that the lower income families have more grants offered to their students based on income. The amount paid from the two categories of parental income and savings and parent borrowing for the lower bracket turned out to be roughly the same. But, a majority of the college tuition payment is through the student borrowing money or earning scholarships.

For the middle income bracket, the parents spend 61% more money for college tuition than in the lower income bracket. This could be because as the family income increases, the ability of the parents to pay for college tuition increases as well. However, student borrowing is still a popular method of payment for this bracket. A possibility could be that loans offer lower interest rates than other payment options allowing students to have more money, or these families in the middle income bracket might be going to more prestigious schools, which tends to cost more, than those in the lower income bracket.

For the higher income bracket, the amount of parental spending was very high compared to the other methods of payment. Again, this shows if the parents make enough money to pay entirely for college tuition, then likely they will. Also noteworthy is that the amount of parental borrowing is slightly higher than in the middle income bracket. These parents in the higher income bracket are used to spending more, so hence they feel comfortable that they can borrow more to pay for tuition when comparing to the lower income brackets. It is also possible that these educational loans offer a great payment plan at a lower interest rate than other payment methods such as direct payment or using a credit card or they can invest their money into something that will yield a higher rate of return than the cost of the educational loan netting a profit.

Table-3-1: Income Level and Method of Payment by Income Bracket, summarizes the data in the Section 3.2.

	Income Level		
Method of Payment	**$0- $50,000**	**$50,000- $100,000**	**$100,000 and Above**
Grants and Scholarships	$3,890	$2,310	$1,260
Student Income and Savings	$1,780	$2,020	$1,100
Friends/Relative Support	$490	$780	$490
Parent Income and Savings	$2,680	$4,340	$11,410
Parent Borrowing	$2,390	$2,480	$3,070
Student Borrowing	$3,900	$4,980	$3,710

Table-3-1: Income Level and Method of Payment by Income Bracket (SallieMae, 2008)

3.3 General Observations on Parental Spending

The study results suggest four methods of payment:
- Current Income
- College Savings Fund
- Retirement Savings Withdrawl
- Other Investment and Savings

This next section describes how parents pay for college tuition and how that differs by income bracket.

3.3.1 Parental Spending Based on an Income of $0-$50,000

Graph-3-8: Parental Spending Based on an Income of $0-$50,000 shows a majority of the parental spending in this category averages at $1,700. The second two most popular methods of parental spending are a college savings fund at $400 or other savings or investments at $340. The least preferred method of parental spending was retirement savings withdrawal at $240.
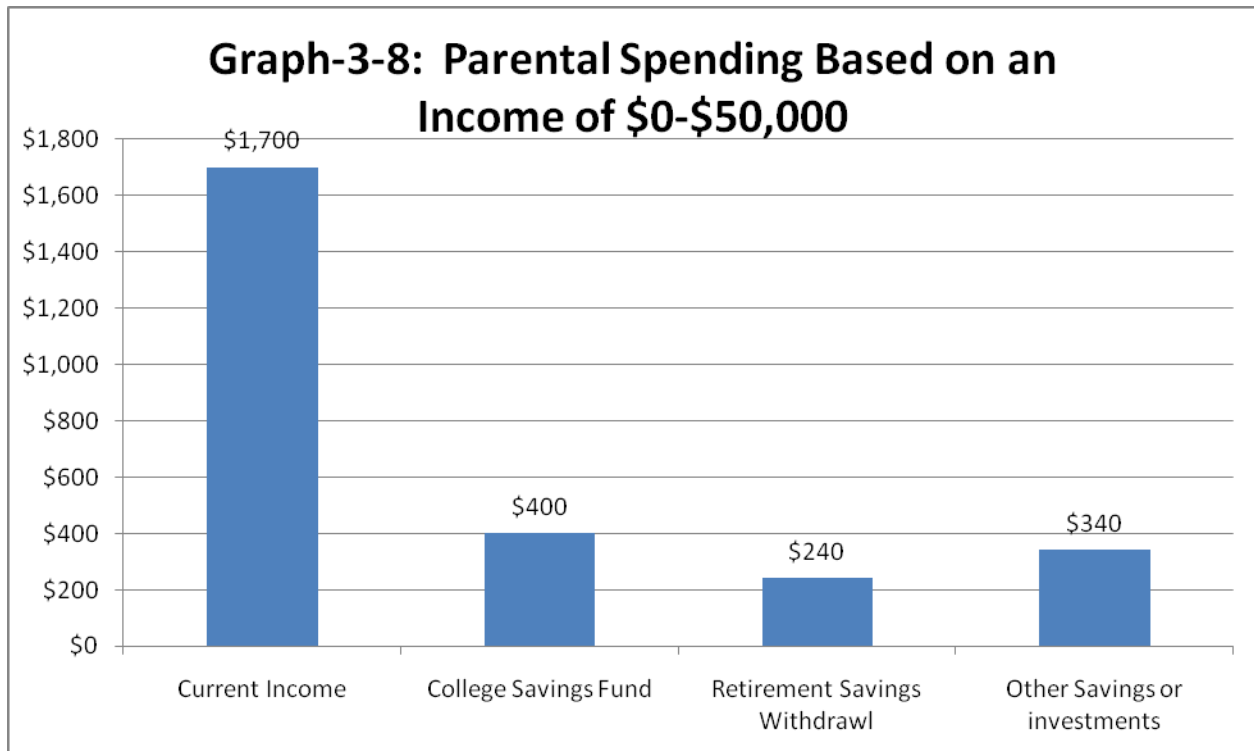
Graph-3-8: Parental Spending Based on an Income of $0-$50,000 (SallieMae, 2008)

3.3.2 Parental Spending Based on an Income of $50,000-$100,000

The parental spending in the next income bracket is shown in *Graph-3-9: Parental Spending Based on an Income of $50,000-$100,000*. Here, the parental spending in this bracket is very similar to that in the lower income bracket. Current income is again the parents' most popular method of paying for college tuition. In this income bracket the amount spent by current income was $2,680. The second two most popular methods of payment were college savings funds, $690, and other savings and investments, $670. Retirement savings withdrawal was again the least popular method of parental spending, in this case $300.

Overall, the amount of money spent by any means in the $50,000-$100,000 income bracket is higher than that of the $0-$50-000 bracket. The likely reason is again, if the family earns more money, more money can be spent on college education. (SallieMae, 2008)
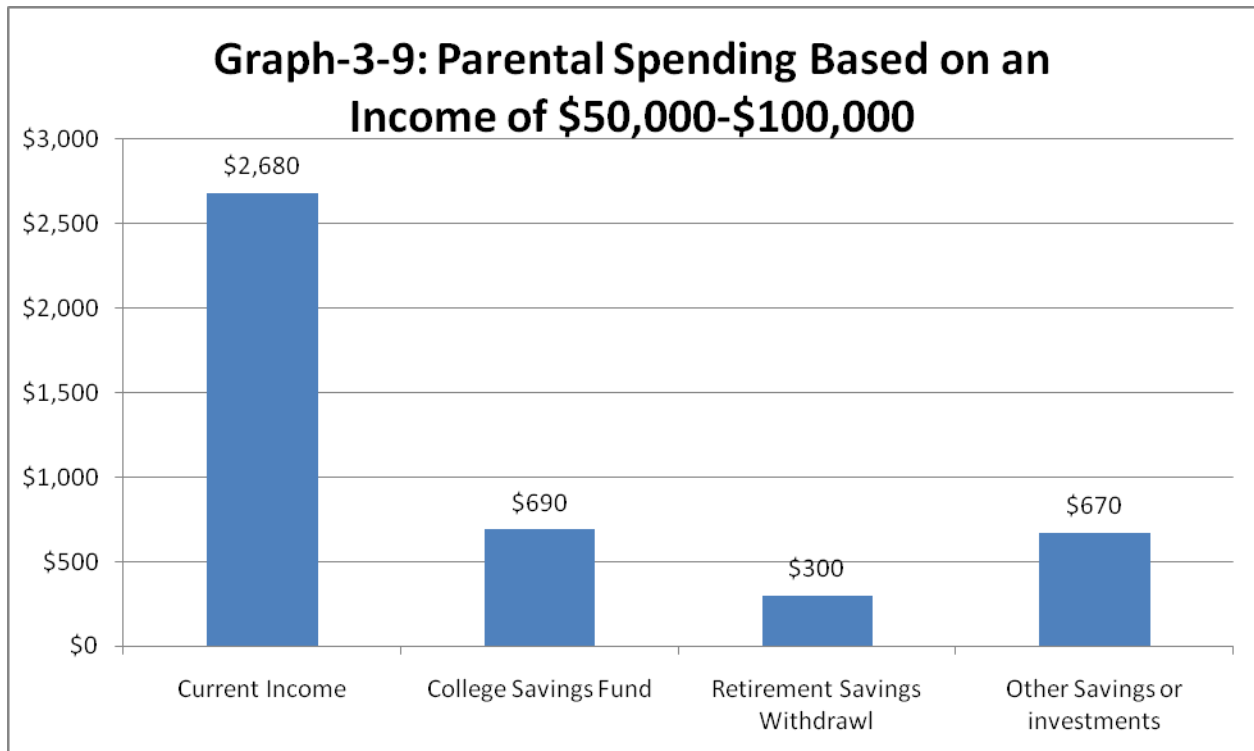
Graph-3-9: Parental Spending Based on an Income of $50,000-$100,000 (SallieMae, 2008)

3.3.3 Parental Spending Based on an Income of $100,000 and Above

Parental spending for college in the final income bracket of $100,000 and Above, is shown in *Graph-3-10: Parental Spending with an Income of $100,000 and Above*. Current income turned out to be the most popular method of parental spending for this income bracket just as for the previous two. The amount of current income spent was $6,030 for this income bracket. Parental spending by college savings funds and other savings proved to be the second most popular method for all three brackets as well. In this higher income bracket, the amount of college savings fund spent was $2,570, and the amount for other savings or investment was $2,630. In this bracket, only $180 was spent out of the retirement savings accounts. This is a drop from the results in the other two income brackets. The reason is if parents can pay for college in a way that does not take money out of a retirement account, that is what they will do. (SallieMae, 2008)

Graph-3-10: Parental Spending Based on an Income of $100,000 and Above
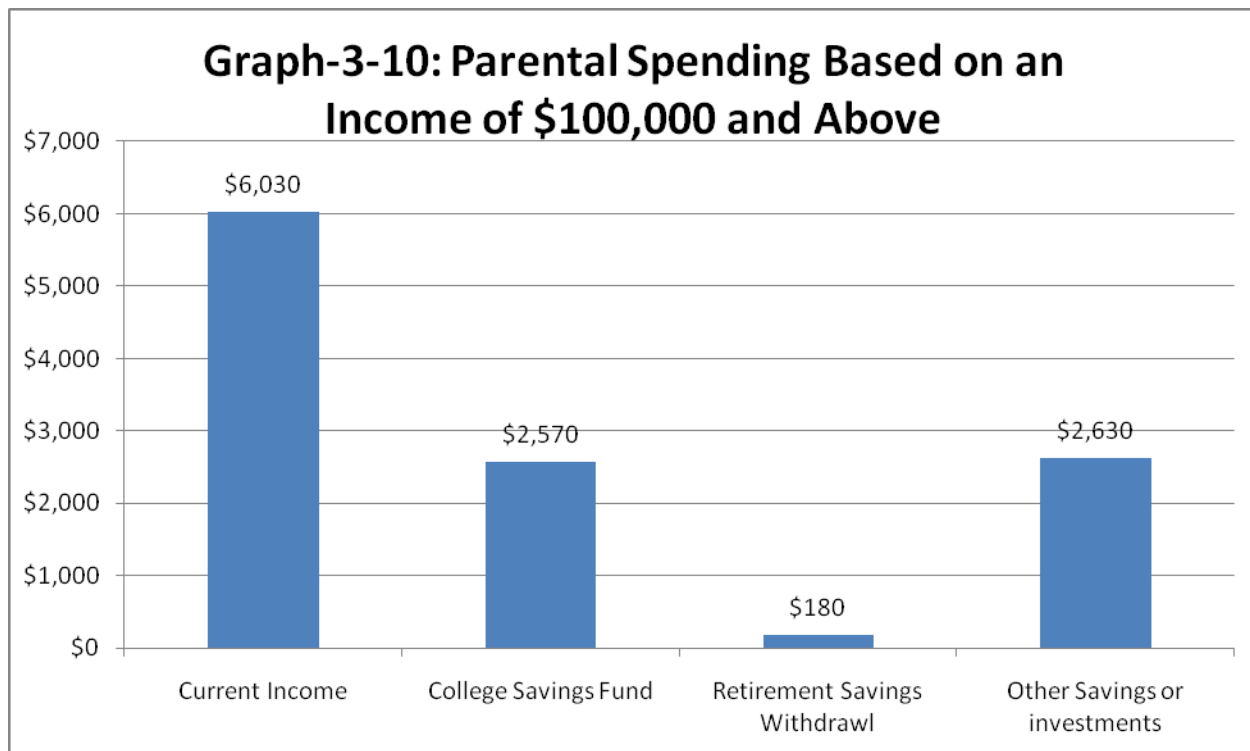
Graph-3-10: Parental Spending Based on an Income of $100,000 and Above (SallieMae, 2008)

3.3.4 Summary of Parental Spending

For the data for parental spending on college, when the income bracket increases, so does the amount of money parents tend to spend on college education for their student. Also, most parents prefer to pay for college with current income. This shows many parents like to pay off college expenses while their children are going to school suggesting they think college is a cost that has to be paid off. Other parents also had some saving accounts set up to pay for tuition; however, less money is taken from a savings account than from current income to pay for college. That can happen for two reasons. Either the parents do not have a separate account for college, or the money in that account runs out, and the parents just pay the remainder from current paychecks. In general, parents do not like to take money from their retirement fund to pay for college for two important reasons. First, the money taken out of a retirement account is taxable, and second, money taken out of that account for college means less to spend after retirement. (SallieMae, 2008)

As with the previous analysis, as the income bracket increases, more spending will occur. Thus, parental spending on college education increased for current income, college savings fund, and other retirement savings with each jump in income bracket. The only sector whose data

decreased was the amount of money taken out of the retirement account in the highest income bracket.

A summary of the amount of parental spending is shown in *Table-3-2: Parental Spending by Income Level*.

	Income Level		
Method of Payment	**$0-$50,000**	**$50,000-$100,000**	**$100,000 and Above**
Current Income	$1,700	$2,680	$6,030
College Savings Fund	$400	$690	$2,570
Retirement Savings Withdrawl	$240	$300	$180
Other Savings or investments	$340	$670	$2,630

Table-3-2: Parental Spending by Income Level (SallieMae, 2008)

3.4 General Observations about Parental Borrowing

The following section breaks down the families who pay for college through parental borrowing in each of the three income brackets.

Sources of borrowing money included the following:
- Federal PLUS Loan
- Private Education Loans
- Home Equity Loans
- Credit Cards
- Retirement Account Loans
- Other Loans

3.4.1 Parental Borrowing Based on an Income of $0-$50,000

Graph-3-11: Sources of Parent Borrowing Based on an Income of $0-$50,000 shows the distribution of parental borrowing for the lowest income bracket. A majority of families use the federal PLUS loan program here at $870. This makes sense because if the federal government has a program set up to help people go to college who cannot afford the tuition; people will be willing to use it according to the Sallie Mae report, "How America Pays for College". The second most popular type of borrowing from this bracket was some type of other loans at $710. Next,

private education loans and home equity loans were the next most popular choices at $390 and $190. The options of borrowing by credit card or taking money out of a retirement account were the least popular, coming in at $130 and $100.
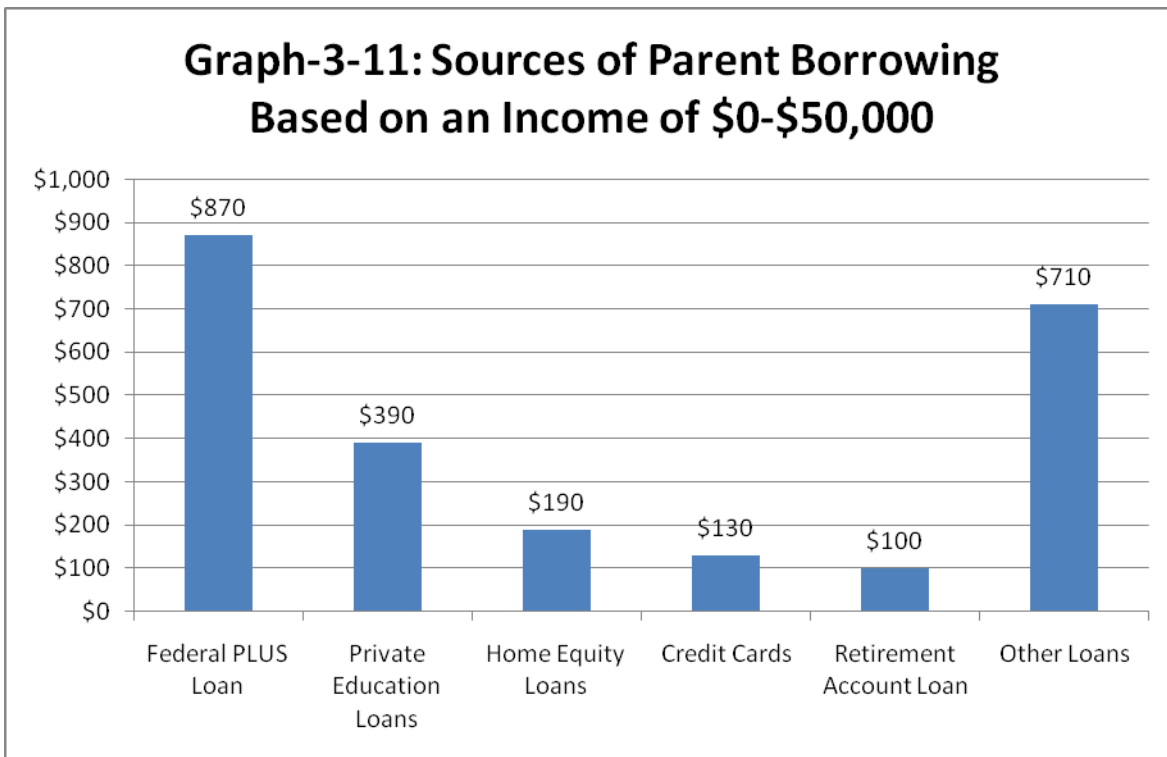
Graph-3-11: Sources of Parent Borrowing Based on an Income of $0-$50,000 (SallieMae, 2008)

3.4.2 Parental Borrowing Based on an Income of $50,000-$100,000

Graph-3-12: Sources of Parent Borrowing Based on an Income of $50,000-$100,000 shows the distribution of parental borrowing for the middle income bracket. The federal PLUS loan program was the most popular choice in this bracket as well. Possibly the interest rates for these student loans were lower than the interest rates of other payment plans. At any rate, bracket borrowed $1040 last year from the federal government. Other loans turned out to be the second most popular method for this group as well with a value of $610, while the third most popular method of payment was via credit card for this group. This group borrowed more money via credit card than the lower income bracket. The reasoning is the families in the higher income bracket feel they can pay off that interest that builds up over time whereas the lower income families can't. The three least favored methods of parent borrowing were private

education loans, retirement account loans, and home equity loans with values of $240, $120, and $110, respectively.

Graph-3-12: Sources of Parent Borrowing Based on an Income of $50,000-$100,000
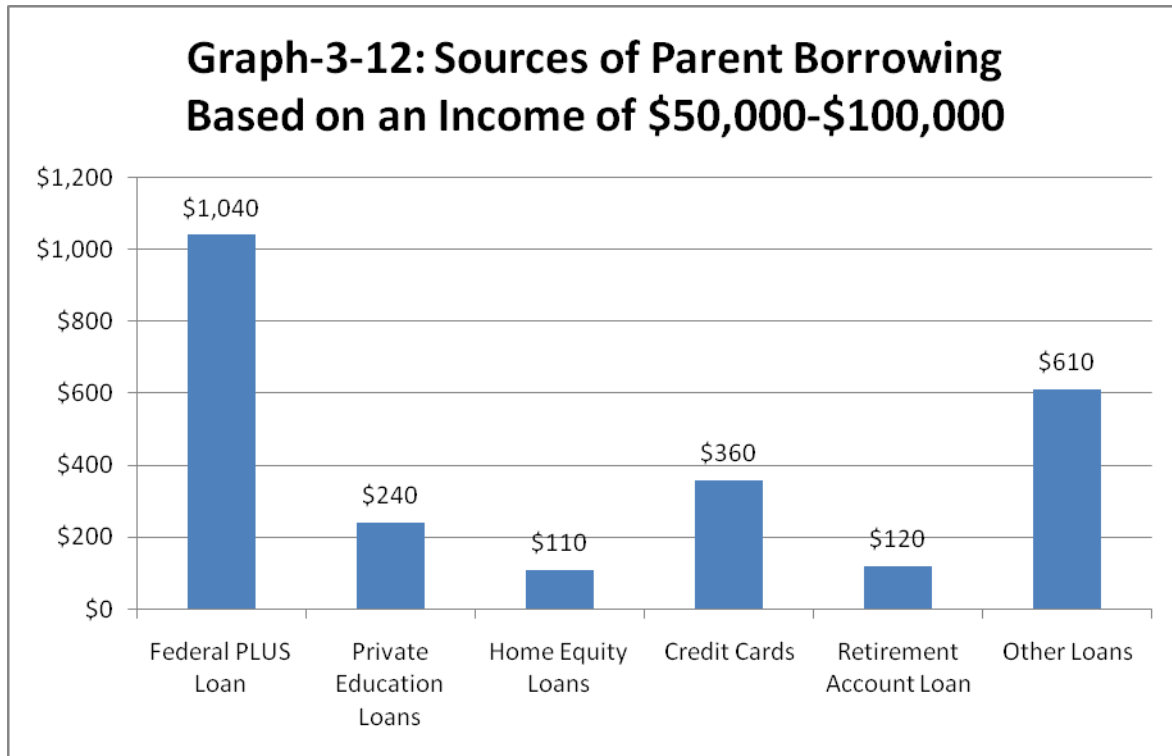
Graph-3-12: Sources of Parent Borrowing Based on an Income of $50,000-$100,000 (SallieMae, 2008)

3.4.3 Parental Borrowing Based on an Income of $100,000 and Above

Graph-3-13: Sources of Parent Borrowing Based on an Income of $100,000 and Above, shows the distribution of parental borrowing for the highest income bracket. Other loans turned out to be the most popular type of borrowing for this group with a value of $1,070, while the federal PLUS loan turned out to be second most popular with a value of $760. The next two most popular methods of borrowing were private education loans and home equity loans with values of $520 and $440. Credit cards were the least favorite method of borrowing for this income bracket, $280. Finally, no one from this income bracket reported withdrawing money from a retirement account to pay for college.
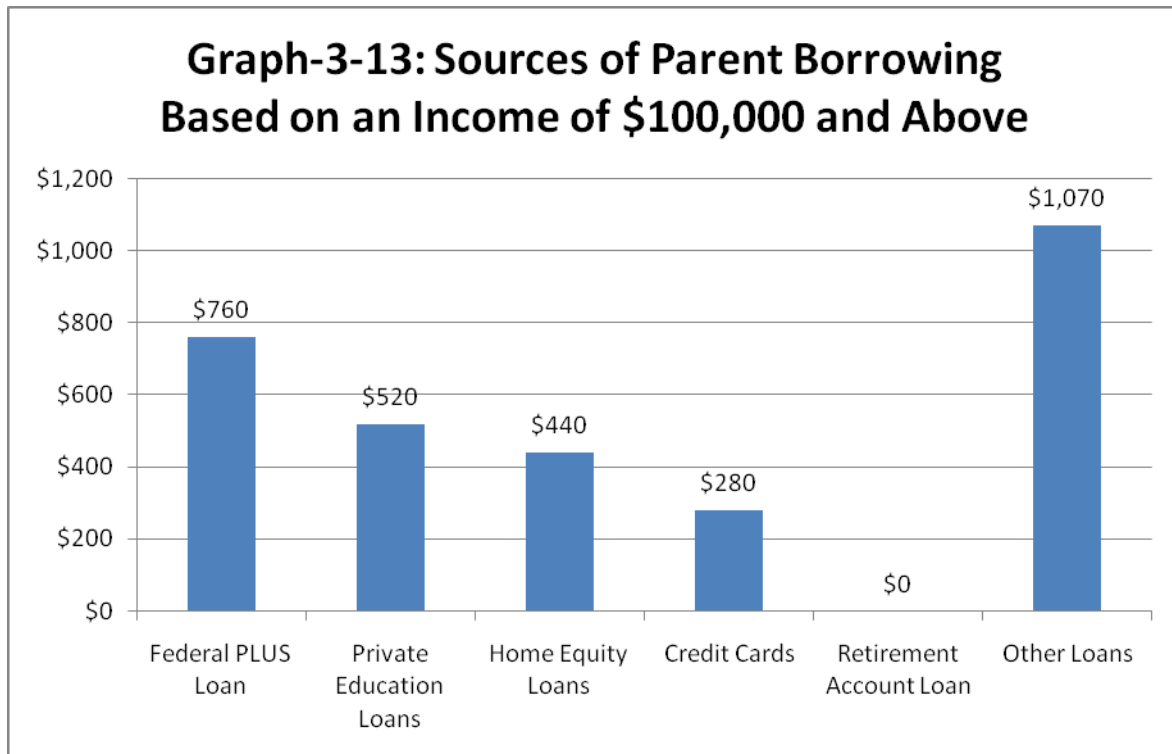
Graph-3-13: Sources of Parent Borrowing Based on an Income of $100,000 and Above

Source	Amount
Federal PLUS Loan	$760
Private Education Loans	$520
Home Equity Loans	$440
Credit Cards	$280
Retirement Account Loan	$0
Other Loans	$1,070

Graph-3-13: Sources of Parent Borrowing Based on an Income of $100,000 and Above (SallieMae, 2008)

3.4.4 Summary of Parental Borrowing

Across the three income brackets, the federal PLUS program and other loans are the two most popular ways to borrow funds. The other loans and the PLUS loans could offer better payback deals to the parents than private education loans, home equity loans, or credit cards. Another similar trend here is how many parents do not like to withdraw from a retirement account. Likely, the reasoning again is parents do not want to pay for their child's education this way. Noteworthy was infomration about borrwoing via credit card. Those families who used a credit card to pay for education used it either because of an emergency situation or becasue the credit could be paid off faster than if a loan were taken out according to "How America Pays for College" by Sallie Mae. Nevertheless, credit card use was highest for the middle income bracket. Probably because it is probably more affordable for them than for those in the lower income bracket. Likely, the reason highest income bracket families did not pay via credit card is becuase they did not want interest to accumulate over time and have to pay it all off at a later

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date. To avoid accumulating interest on credit cards and if some other loans offered lower interest rates than the credit card, they would take the other loans.

A breakdown of how parents borrowed with each income bracket is shown below in *Table-3-3: Sources for Parent Borrowing by Income Level*.

	Income Level		
	$0-$50,000	**$50,000-$100,000**	**$100,000 and Above**
Federal PLUS Loan	$870	$1,040	$760
Private Education Loans	$390	$240	$520
Home Equity Loans	$190	$110	$440
Credit Cards	$130	$360	$280
Retirement Account Loan	$100	$120	$0
Other Loans	$710	$610	$1,070

Table-3-3 Sources for Parent Borrowing by Income Level (SallieMae, 2008)

3.5 General Observations of Student Contribution

For the students who paid for college individually, an approximate break down of how college is paid for is broken up into six categories.

- Grants
- Scholarships
- Work-Study
- Savings
- Current Income
- Other Non-Borrowed Money

This section will show the distribution by income level of how these students pay for college.

3.5.1 Student Contributions Based on an Income of $0-$50,000

Graph-3-14: Student Contributions Based on the Income of $0-$50,000 shows a distribution of how students pay for college in this bracket. Scholarships and grants were two huge methods of payment for this bracket at $1,990 and $1,900. Other students in this bracket paid for

college by current income, $870 and savings, $660. The lowest two methods of payment here turned out to be a work-study program and paying by another form of non borrowed money.
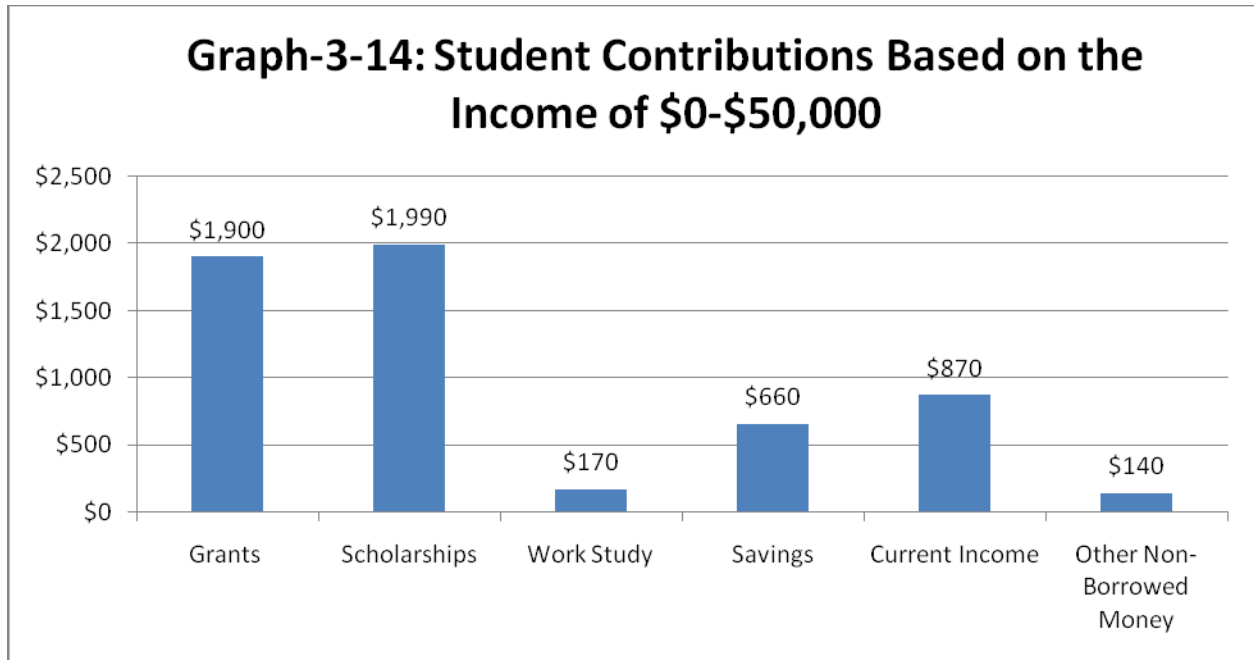
Graph-3-14: Student Contributions Based on the Income of $0-$50,000 (SallieMae, 2008)

Scholarships and grants were a huge method of payment for this income bracket. As stated in an earlier section, many families in the lower income bracket otherwise might not be able to afford college at all for their child since scholarships and grants are the only way to pay for school. Some students have to work while they are in college so tuition can be paid and others have saved for college for quite a while to pay for tuition. Finally, for this income bracket, work study programs and other sources of borrowing are rare.

3.5.2 Student Contributions Based on an Income of $50,000-$100,000

Graph-3-15: Student Contribution Based on an Income of $50,000-$100,000 shows scholarships were the most popular type of student payment for this income bracket at a value of $1450. Unlike for the lower income bracket, the second most popular type of payment was current income at $1,010, while grant payment was third at a value of $860. Since this higher income bracket pays more from current income than the lower bracket, this could show more families in the higher income bracket can afford to pay for college tuition with their current paychecks. Savings was the next favored method of payment at a value of $730. The least favored

methods of payments for this income bracket were other non borrowed loans and work study at values of $250 and $30, respectively.

Graph-3-15: Student Contribution Based on an Income of $50,000-$100,000
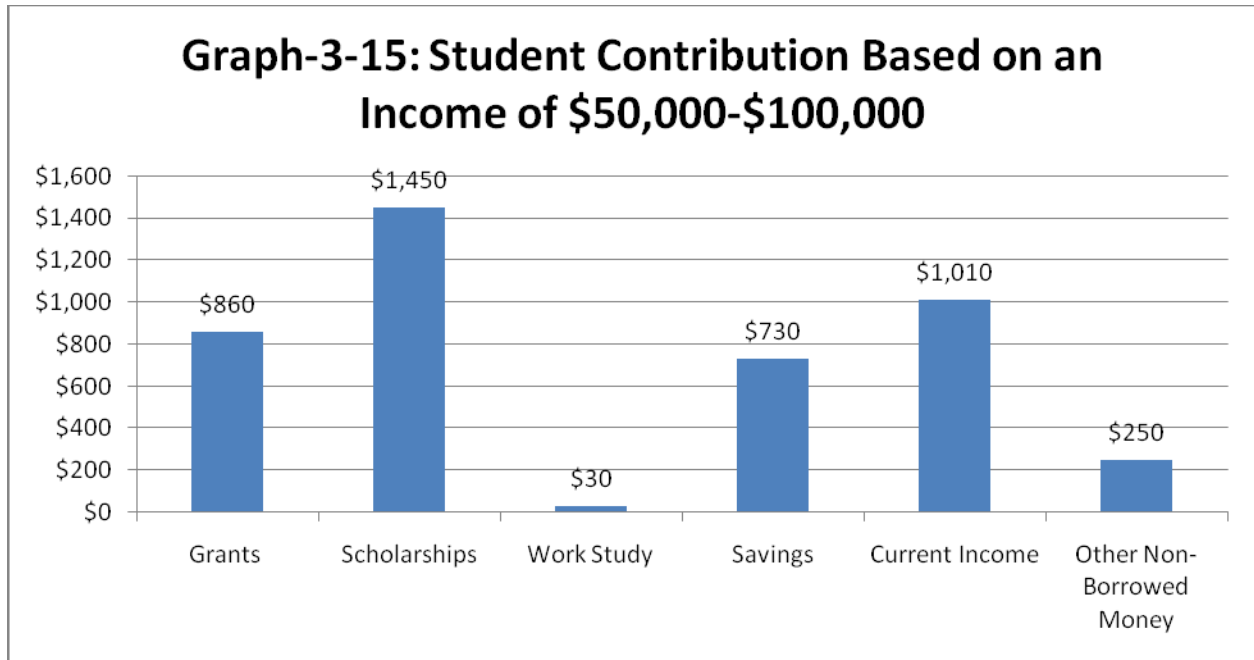
Graph-3-15: Student Contribution Based on an Income of $50,000-$100,000 (SallieMae, 2008)

3.5.3 Student Contributions Based on an Income of $100,000 and Above

Graph-3-16: Student Contribution Based on an Income of $100,000 and Above shows the most popular method of student payment was by scholarships at a value of $850. The second two most popular methods of payment were savings and grants at values of $570 and $410. Next, the current income of the students in this bracket paid for tuition at a value of $310. Finally, other non borrowed sources and work study program paid for $130 and $90 of tuition for the higher income bracket.
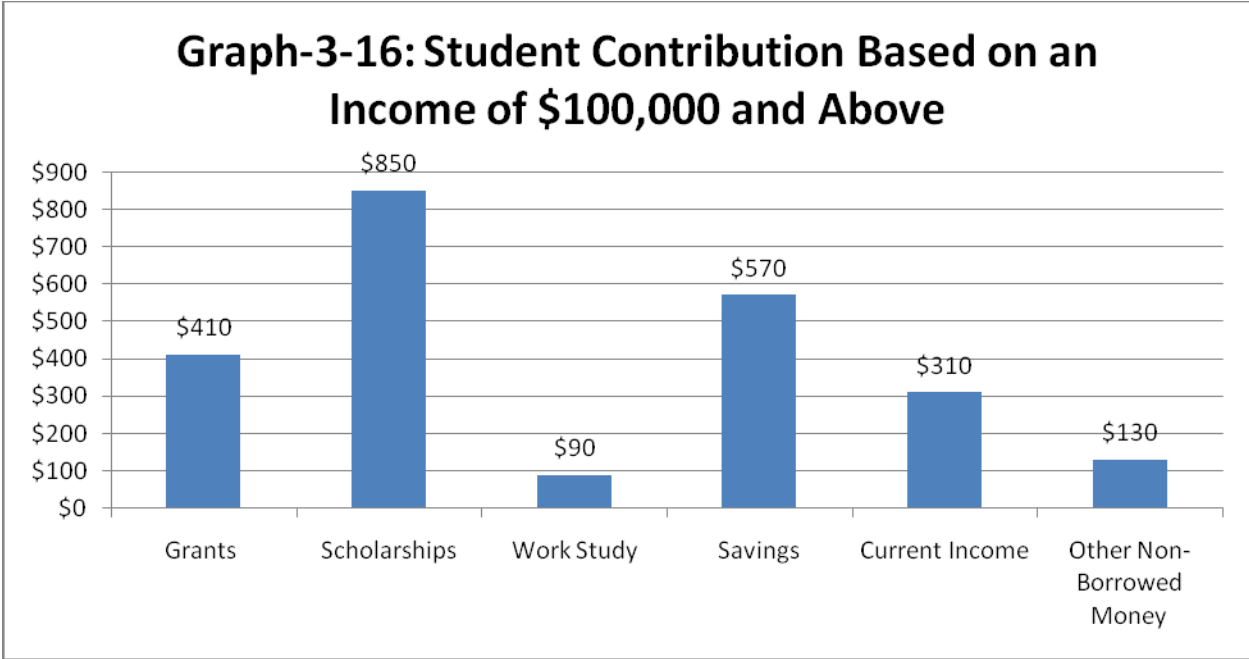
Graph-3-16: Student Contribution Based on an Income of $100,000 and Above (SallieMae, 2008)

3.5.4 Summary of Student Contributions

A consistent trend among all three income brackets is that the most popular method of student payment was through scholarhips. Also, as the income bracket increased, the amount of scholarship money decreased. The reasoning is based on the likelihood that students from the lower income families can not pay for college like the student can in the higher income brackets. It is unknown if the students in the lower income bracket apply for more grants and shcolarships than the students in the higher income brackets or if more scholarships and grants are given to those studnets in the lower income bracket because they cannot pay for their college educaiton like the students in the two higher income brackets.   Next, current income was a very popular method of payment for the middle income bracket. Many of these students might work while in school and use a lot of that money for college tuition. That these students use current payment for tuition is a sign of their economic status. Thus, they do not make as much as the higher income bracket students, which results in less borrowing, but at the same time, they make more than those in the lower income bracket, so they are offered fewer scholarships.

Table-3-4: Student Borrowing by Income Level summarizes of how students pay for college by income level.

	$0-$50,000	$50,000-$100,000	$100,000 and Above
Grants	$1,900	$860	$410
Scholarships	$1,990	$1,450	$850
Work Study	$170	$30	$90
Savings	$660	$730	$570
Current Income	$870	$1,010	$310
Other Non-Borrowed Money	$140	$250	$130

Table-3-4: Student Contributions by Income Level (SallieMae, 2008)

3.6 Student Borrowing

This section shows the distribution of student borrowing by income level. The Sallie Mae report divided student borrowing into the following four categories.
- Federal Student Loans
- Private Education Loans
- Credit Cards
- Other Loans

3.6.1 Student Borrowing Based on an Income of $0-$50,000

Graph-3-17: Student Borrowing Based on an Income of $0-$50,000 shows that federal student loans were the most popular way to pay for tuition for the lower income bracket. As with parental borrowing, the government has set up loan programs that specifically help these lower income families pay for college. Accordingly, students borrowed $2200 in federal student loans. The second most popular type of borrowing for this bracket was private education loans at a value of $950 followed by other loans at $690. Credit cards were not a popular method of payment for this bracket at a value of only $60.
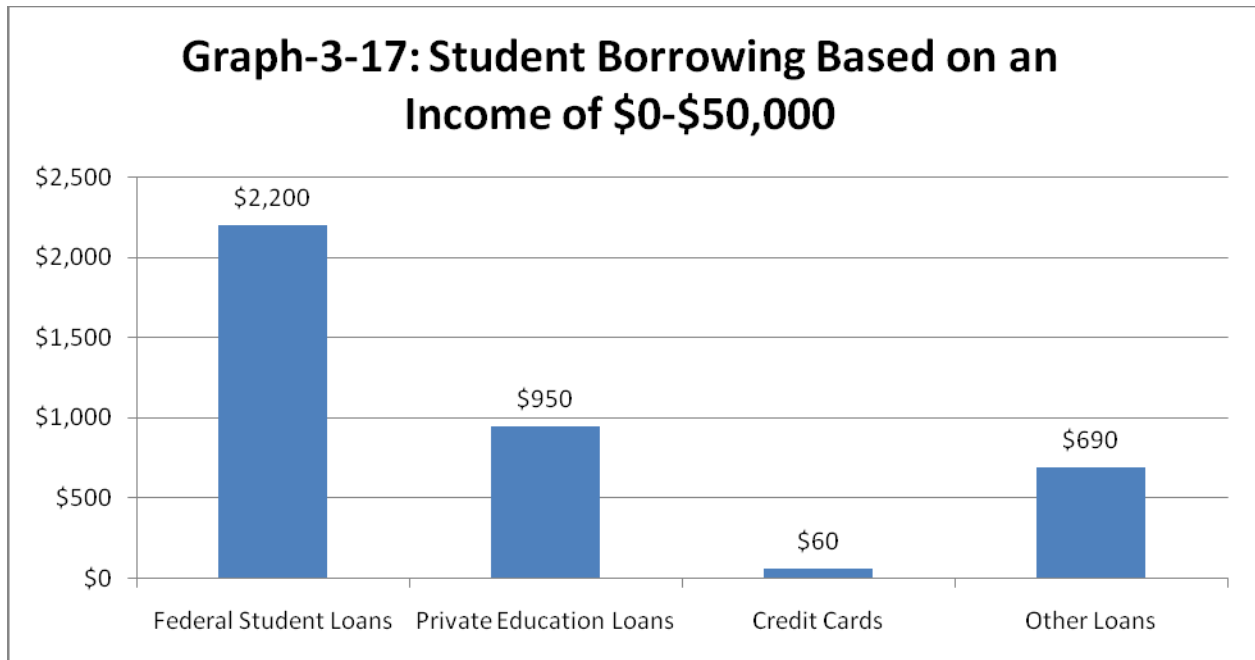
Graph-3-17: Student Borrowing Based on an Income of $0-$50,000 (SallieMae, 2008)

3.6.2 Student Borrowing Based on an Income of $50,000-$100,000

Graph-3-18: Student Borrowing Based on an Income of $50,000-$100,000 shows the distribution of student borrowing for the middle income bracket. Federal student loans were also the most popular way to borrow for this income bracket at a value of $2,440. The second most popular type of borrowing for this bracket was other loans at a value of $1550 followed by private education loans at $840. Credit cards were not a popular method of payment for this bracket at a value of $150.

Using other loans is a more popular payment method for this income bracket because many of these families make too much money to qualify for certain loans that require that the family be below a certain income level for them to qualify. In the middle income bracket, many families make just enough to not qualify for private education loans. This general information is according to the report, "How America Pays for College" by Sallie Mae but the specific types of loans were not specified.
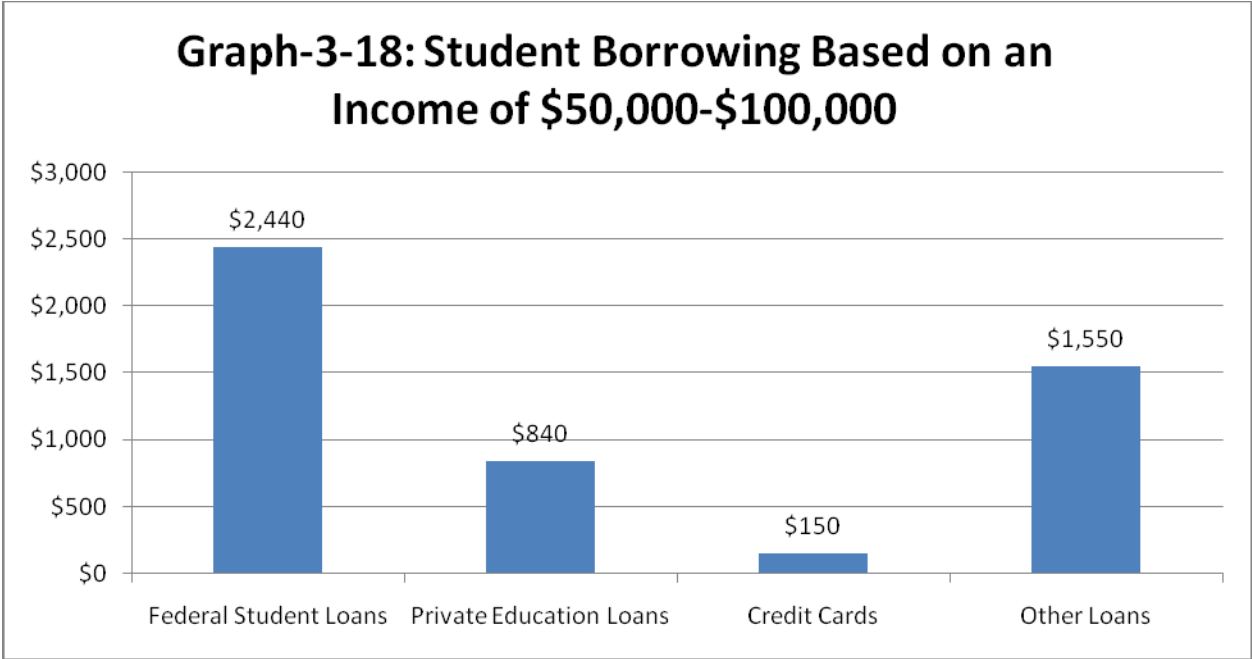
Graph-3-18: Student Borrowing Based on an Income of $50,000-$100,000 (SallieMae, 2008)

3.6.3 Student Borrowing Based on an Income of $100,000 and Above

Graph-4-19: Student Borrowing Based on an Income of $100,000 and Above shows the distribution of student borrowing for the highest income bracket. Again, the most popular method of payment here was federal student loans at a value of $1,800. Private education loans came in second with a value of $1,220 followed by other loans at a value of $540. This high income bracket also did not like payment by credit card, which was at a value of $150.
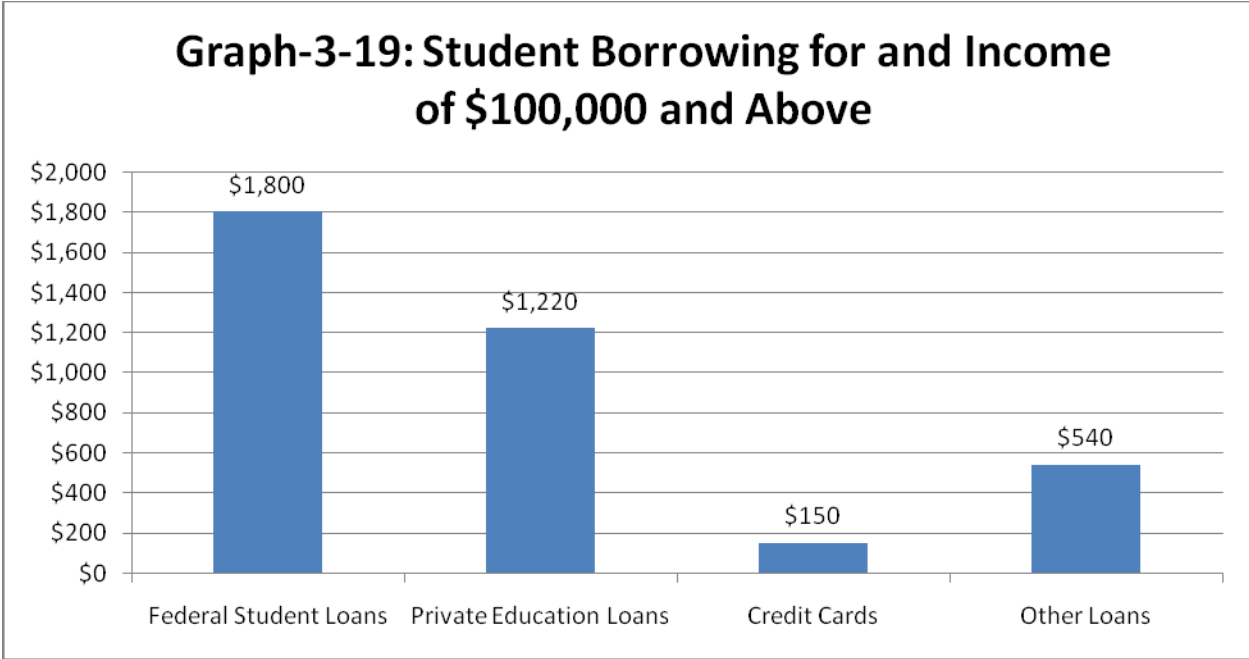
Graph-3-19: Student Borrowing Based on an Income of $100,000 and Above

3.6.4 Summary of Student Borrowing

A general observation regarding student borrowing is that federal student loans are the most popular method of borrowing. The middle income bracket had the highest number of federal student loans, while the highest income bracket borrowed the lowest amount. This can happen for one of two reasons. The higher income families do not qualify for a federal student loan because their income is too high, or the higher income families do not need to take out as much to borrow for college tuition. Next, private education loans were highest for the higher income bracket. The students from these families are more likely to go to more prestigious schools where tuition can be higher. Also, in parental borrowing, payment by credit card is not popular to avoid a huge amount of credit card debt at the end of college.

Table-3-5: Student Borrowing by Income Level shows the distribution of student borrowing by income level.

	$0-$50,000	$50,000-$100,000	$100,000 and Above
Federal Student Loans	$2,200	$2,440	$1,800
Private Education Loans	$950	$840	$1,220
Credit Cards	$60	$150	$150
Other Loans	$690	$1,550	$540

Table-3-5: Student Borrowing by Income Level (SallieMae, 2008)

3.7 How the Average Family Pays for College at a Four Year School

Graph-3-20: How the Average Family Pays for College at a Four Year Public School and *Table-3-6* show how much money is spent from the following six categories.
- Grants/Scholarships
- Student Income and Savings
- Friends and Relatives
- Parent Income and Savings
- Parent Borrowing
- Student Borrowing

For four year universities, the average family is paying mostly from parental income and savings in the amount of $5,850. The second three most popular methods of payment are student borrowing, grants and scholarships and parental borrowing at values of $3,780, $2,400, and $2,310 respectively. Very little tuition payment on average came from student income and savings or from friends and relatives at values of $1,560 and $740.
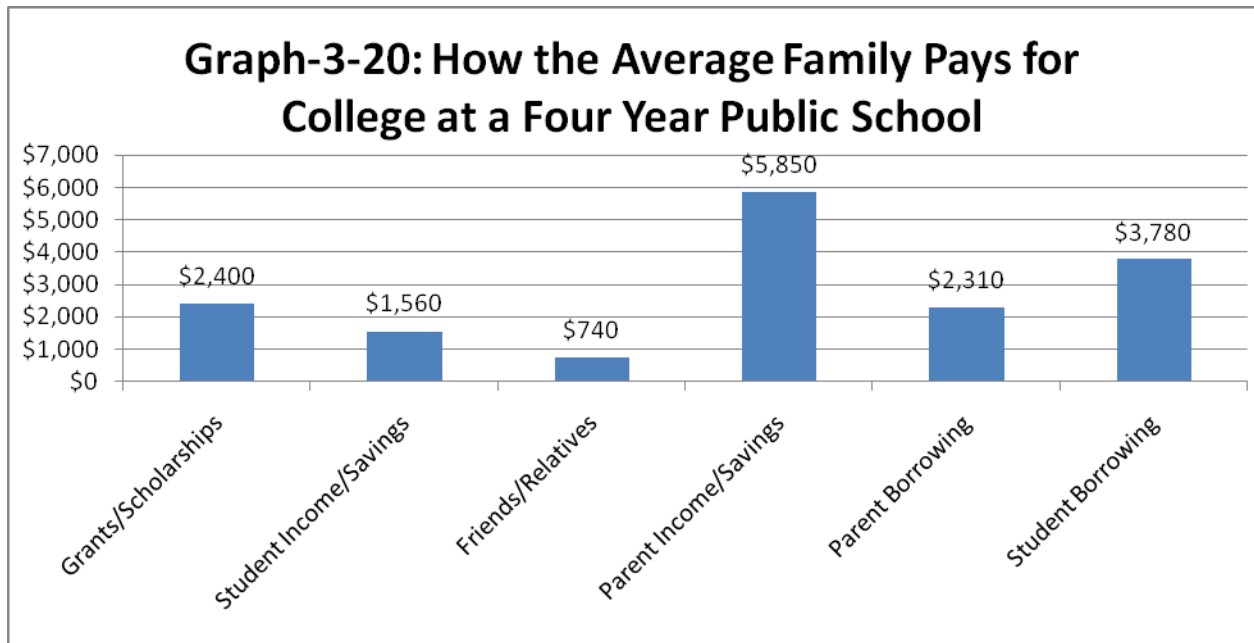
Graph-3-20: How the Average Family Pays for College at a Four Year Public School (SallieMae, 2008)

Method of Payment	Amount Paid
Grants/Scholarships	$2,400
Student Income/Savings	$1,560
Friends/Relatives	$740
Parent Income/Savings	$5,850
Parent Borrowing	$2,310
Student Borrowing	$3,780

Table-3-6: How the Average Family Pays For College at a Four Year Public School (SallieMae, 2008)

3.8 Percentage of Students Who Attend Four Year Colleges

This section examines the percentage of students from each income bracket who choose four year schools and universities. Using the previous information on how students pay for college, the KSU COE possibly can develop some financial packages that reflect the income levels for the prospective student's families.
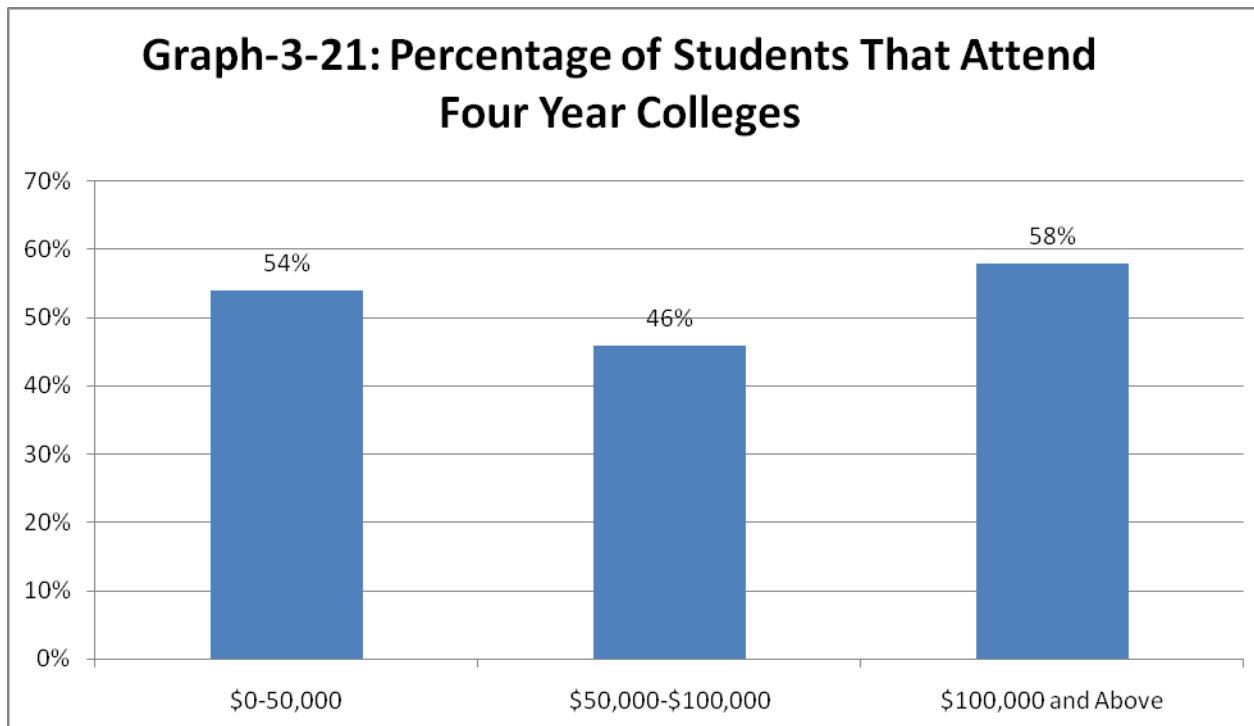
Graph-3-21: Percentage of Students Who Attend Four Year Colleges (SallieMae, 2008)

Graph-3-21: Percentage of Students Who Attend Four Year Colleges shows the number of students from each income bracket who attend 4-year colleges. From the lower income bracket, 54% chose to attend a four-year college, while 46% of the middle income bracket attended a four year school and 58% of the higher income bracket did the same in the middle income bracket, fewer students attended a four year public school because many of these families possibly can afford a four year private school. Next, in the higher income bracket, many of these families earn enough a prospective student will not consider community college before finishing their education at a four year school. The 58% shows an increase over the previous two income brackets due to fewer students choosing to start at community college in this higher income bracket. The percentages of students attending four year colleges are also shown in *Table-3-7* following.

Income Bracket	Percentage of Students that Attend 4 year colleges
$0-50,000	54%
$50,000-$100,000	46%
$100,000 and Above	58%

Table-3-7: Percentage of Students that Attend Four Year Colleges (SallieMae, 2008)

3.9 Cost of Attendance

For each of the income brackets mentioned, the total cost of attending college is shown in *Table-3-8: Cost of Attendance by Income Level*. As the table shows, the families in the lower and the higher income brackets spent more than the families in the middle income bracket. A big reason for this difference would be college choice. Many families in the higher income families have students who go to more expensive universities. Again, those who earn more money can usually spend more money for their college education. Assessing why the cost of attendance in middle income bracket is lower, some students in these families might choose to start at community college to save money before transferring to a four year university. Also noteworthy when comparing the cost from the middle income bracket to the lower income bracket while referencing previous information on scholarships is that more scholarships and grants are given to those in the lower income bracket so that amount of scholarships money spent is included in the $24,897.

Method of Payment	Cost of Attendance
$0-50,000	$24,897
$50,000-$100,000	$13,772
$100,000 and Above	$38,234

Table-3-8: Cost of Attendance by Income Level (SallieMae, 2008)

4.0 How Do Current Students in the College of Engineering Pay for Their Education?

This section shows how the current students in the KSU COE pay for their education. This section also works through some statistical problems to compare how the students in the KSU

COE compare to the students surveyed nationally in "How America Pays for College." and offers conclusions. Finally, this section reviews every financial based question on the survey.

4.1 Are you solely paying for your college tuition?

The first question asked of the students on the questionnaire was

"Are you solely paying for your college tuition?"

For this question, 24 students answered yes, and 65 answered no. This shows many students are getting some sort of help paying for school perhaps from their family, student loans, or scholarships along with other options. To determine how the number of students paying solely for a KSU COE education compared to the national average, a hypothesis test was run with a step by step breakdown.

The national average of the students who pay for their own college education is assumed to be 10%. This information is according to the report, "How America Pays for College" by Sallie Mae. The standard deviation in this problem was assumed to be 0.5 with α Value at 0.05.

4.1.1 Student Payment with the Help of Loans

From the questionnaire, those students who answered saying they pay solely for their education, 19 of 89 do it with student loans. These students are paying either with current income or from a savings account. Since only 5 of these students reported not using some type of student loan, that is the number that will be used to compare to the national average.

Step 1: State the Null and Alternative Hypothesis (H_0, H_A) and α Value

(Null Hypothesis) H_0 = The percentage of engineering students at the KSU COE who solely pay for their college tuition is 10%.
(Alternative Hypothesis) H_A = The percentage of engineering students at the KSU COE who solely pay for their college tuition is greater than 10%.
Assume α Value= 0.05

Step 2: Calculate the Test Statistic (T.S.)

T.S.= $(y_{avg} - \mu) / (\sigma /n)^{1/2}$

Here,

y_{avg}=5/89 or 6% (Data from the questionnaire)

μ= 10% (the national average)

σ or s= 0.5

n=89

$(6 - 10) / (0.5 /89)^{1/2}$= -53.4 (test statistic)

Once all the values are plugged in and the calculation is run, the test statistic turned out to be -53.4. (Absolute value of 53.4)

Step 3: Find the P-Value

Refer to Table-3-1B to find the P-Value for a "z" of 53.4. As the Table shows the p-value is going to be approximately zero. The P-Value does not need to be doubled here since this is a one sided test.

Therefore, since the p-value is less than the α value of 0.05, H_0 can be rejected.   So, the results of this test show strong evidence exists that the percentage of students in the KSU College of Engineering who solely pay for their education is not the national average of 10%.

Since the percentage of students who solely pay for their education in the KSU College of Engineering is different than the national average, a confidence interval can be used to give a better idea of what the actual percentage is in the KSU COE.

Below is a 95% confidence interval for the students in the KSU COE who solely pay for their education with a step by step description.

Step 1: Reference Formula 5

95% C.I.= y_{avg}+or – $1.96σ / (n)^{1/2}$

y_{avg}=6%

σ=0.5

n=89

Step 2: Substitute Values In the Equation

.06+or – 1.96(0.5) / (89)$^{1/2}$ = (-0.044,0.164)

Step 3: Communicate Results

With 95% Confidence, the percentage of students in the KSU COE who solely pay for their education is between 0% and 16%. This range does include the 6% from the questionnaire so the confidence interval is correct.

While this percentage is slightly higher than the national average, the relative percentage of students who fund their own education still remained pretty small. A big reason for this is that the students surveyed were fourth year COE students. Quite likely, some students' parents could not cover the cost of tuition any more, or students' loans ran out, resulting in students having to pick up the full cost of tuition. Also, the students surveyed were engineering majors whose tuition could be higher than that of a student from another major.

4.1.2 Why Do So Few Students Not Solely Pay for their KSU COE Education?

 Many factors can play a part in a student not paying full tuition; however, a lot of the same reasons why the average college student on the national level doesn't pay solely are applicable here. According to Tom Roberts, the most obvious one would be they just can not afford the entire cost of their college education by themselves given the cost of classes, food, books, housing, and so on. (Roberts, 2009) Next, some students are fortunate enough to go to college on scholarship while others have had a college fund set up for them in their family since the time they were very young, or their parents could pay their entire tuition. Finally, yet other students take out student loans.

Also, many prospective students will work during high school and even in college to cover the cost of tuition. But the money they earn will not even come close to covering one year of college tuition. Also, while many high school students will have jobs, they use that money for entertainment, food, and books as well as for tuition.

Next is a pie chart showing how many students in the KSU COE can pay for their college education alone by the questionnaire. In *Pie Chart-4-1: Distribution of Students that Solely Pay for Their KSU COE Education*, it shows that only 6% of the students in the KSU COE pay for their education alone while 94% need some funding help of some kind.
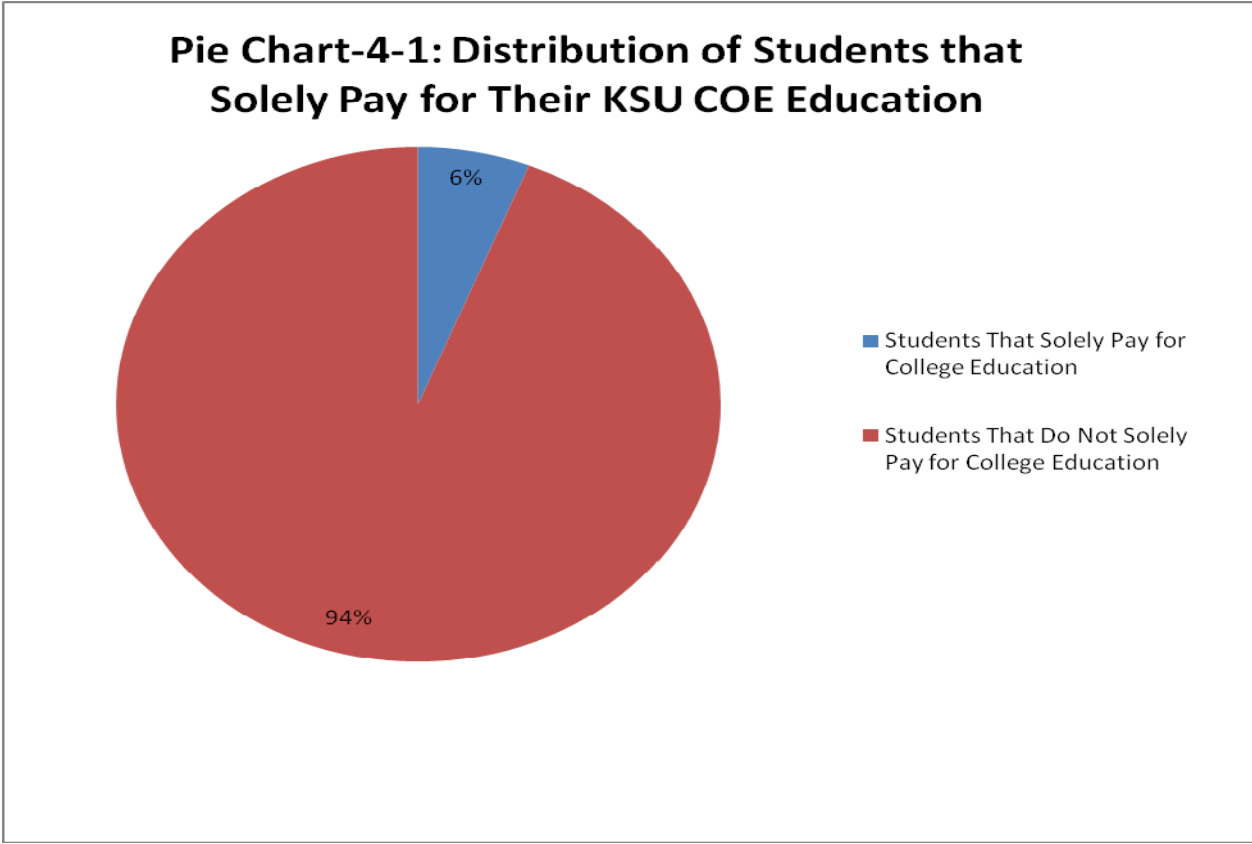
Pie Chart-4-1: Distribution of Students that Solely Pay for Their KSU COE Education (SallieMae, 2008)

4.2 Are Your Parents Solely Paying For Your College Tuition?

The next question asked of the students on the questionnaire was

"Are Your Parents Solely Paying For Your College Tuition?"

When the students were asked if their parents were solely paying for their college tuition, 23 answered yes, and 66 answered no. The results of this data might show that tuition for KSU COE education is becoming more expensive, or that it is higher than the cost of other majors. The results from the questionnaire show around 26% of the students in the KSU COE have their parents cover tuition which is lower than the national average of 32%.

4.2.1 Parent Payment

Students in the questionnaire who have their parents pay solely for their education, three of these students reported using a type of student loan. For the other 20 students in this group, tuition payment was covered by a combination of parental income or savings without additional student loans or student income. Since only 20 students reported not using any loans, that is the number that will be compared to the national average.

A confidence interval for the number of students whose parents cover tuition is given below.

Step 1: Reference Formula 5

95% C.I.= y_{avg}+or – 1.96σ / (n)$^{1/2}$

y_{avg}=20/89 = 22%
σ=0.5
n=89

Step 2: Substitute Values In the Equation

.22+or – 1.96(0.5) / (89)$^{1/2}$ = (0.116, 0.324)

Step 3: Communicate Results

From the confidence interval, on average between 11% and 32% of the students in the KSU COE have their parents pay entirely for their education.

The reasons for this percentage being lower than the national average are similar to the reasons why KSU COE students cannot fund their own education. Again, money can run out in the parent's tuition account for their college student by the fourth year or the fifth year in college. Something else to consider, again, is the higher cost of an engineering education. Simply put, higher cost means the parents won't be able to cover full tuition. As a result, the parents are forced to take out loans, have their college students cover some tuition, or the student could take out loans.

The hypothesis test below shows that the percentage of students in the KSU COE whose parents solely pay for their education is different from the national average.

In this test, α is assumed to be 0.5, and standard deviation is assumed to be 0.5.

Step 1: State the Null and Alternative Hypothesis (H_0, H_A) and α Value

(Null Hypothesis) H_0 = The percentage of engineering students at the KSU COE whose parents pay for their college tuition is 32%.
(Alternative Hypothesis) H_A = The percentage of engineering students at the KSU COE whose parents pay for their college tuition is less than 32%.
α Value = 0.05

Step 2: Calculate the Test Statistic (T.S.)

T.S.= $(y_{avg} - μ) / (σ /n)^{1/2}$

Here,
y_{avg}=22/89 or 22% (Data from the questionnaire)
μ= 32% (the national average)
σ or s= 0.5
n=89

$(22 - 32) / (0.5 /89)^{1/2}$= -133.4 (test statistic)

Once all the values were plugged in and the calculation run, the test statistic turned out to be -133.4. (Absolute value of 133.4)

Step 3: Find the P-Value

Refer to Table-A3 to find the P-Value for a "z" of 133.4. As the table shows the p-value is going to be approximately zero. The value does not need to be doubled in this example because it is a single sided test.

Therefore, since the p-value is less than the α value of 0.05, H_0 can be rejected.   So, the results of this test show very strong evidence that the percentage of students in the KSU COE who solely pay for their education is less than the national average of 10%.

The next pie chart shows the percentage of students in the KSU COE whose parents pay for their education. *Pie Chart-4-2: Distribution of Students in KSU COE Whose Parents Solely Fund Their Education* is shown below.
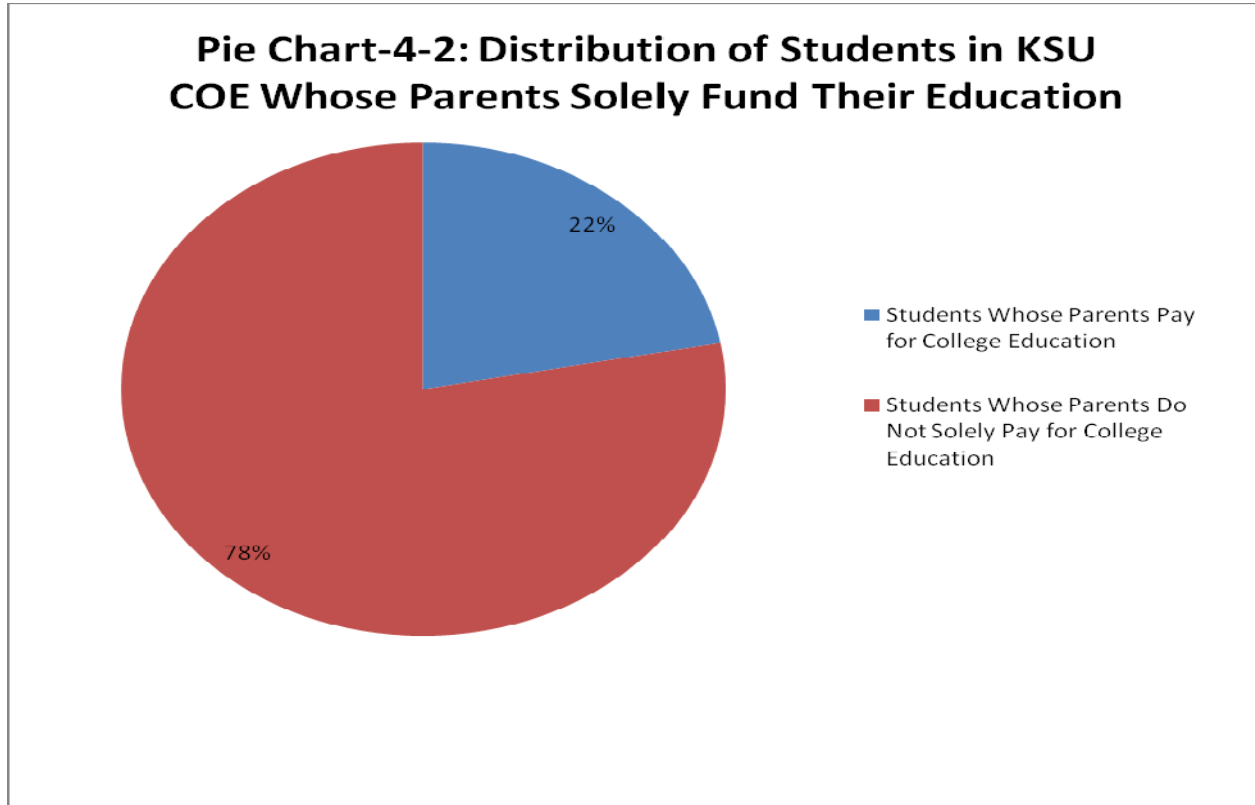
Pie Chart-4-2: Distribution of Students in KSU COE Whose Parents Solely Fund Their Education (SallieMae, 2008)

4.2.2 Why is the Percentage of Parents That Solely Pay for Their Child's KSU COE Education Only 22%?

The reasons why parents do not solely pay for their child's KSU COE education are the same as those stated before: Many parents cannot cover the cost of tuition because it is just too expensive; other parents might be able to cover tuition for the first three years of college, but then need to borrow loans, or have their child help out with the tuition payments.

Again, another important point is these students are fourth or fifth year college students in the KSU COE. These students might have been paying for their tuition differently when they started at KSU given that families' financial situations can change as their children go through college.

4.3 Are You and Your Parents Dividing the Costs of Your College Tuition?

The third question on this questionnaire was

   "Are you and your parents dividing the costs of your college tuition?"

When asked if the student and parents are dividing the cost of college tuition, 34 students answered yes and 55 answered no; therefore, 38% of these students divide tuition with parents. This is double the percentage of students whose parents solely pay and more than a third more than the percentage of students who pay solely. Likely having to split cost between parent and student for college tuition comes from both parties not having enough funds to cover the entire cost.

Of note, discussion of splitting the cost of tuition does not address whether the student or parent borrows money through any type of loan. However, the questionnaire did ask the students if they used loans to fund their education which is addressed in the next subsection.

Pie Chart-4-3: Distribution of Students in KSU COE That Split Tuition with Their Parents shows this percentage.
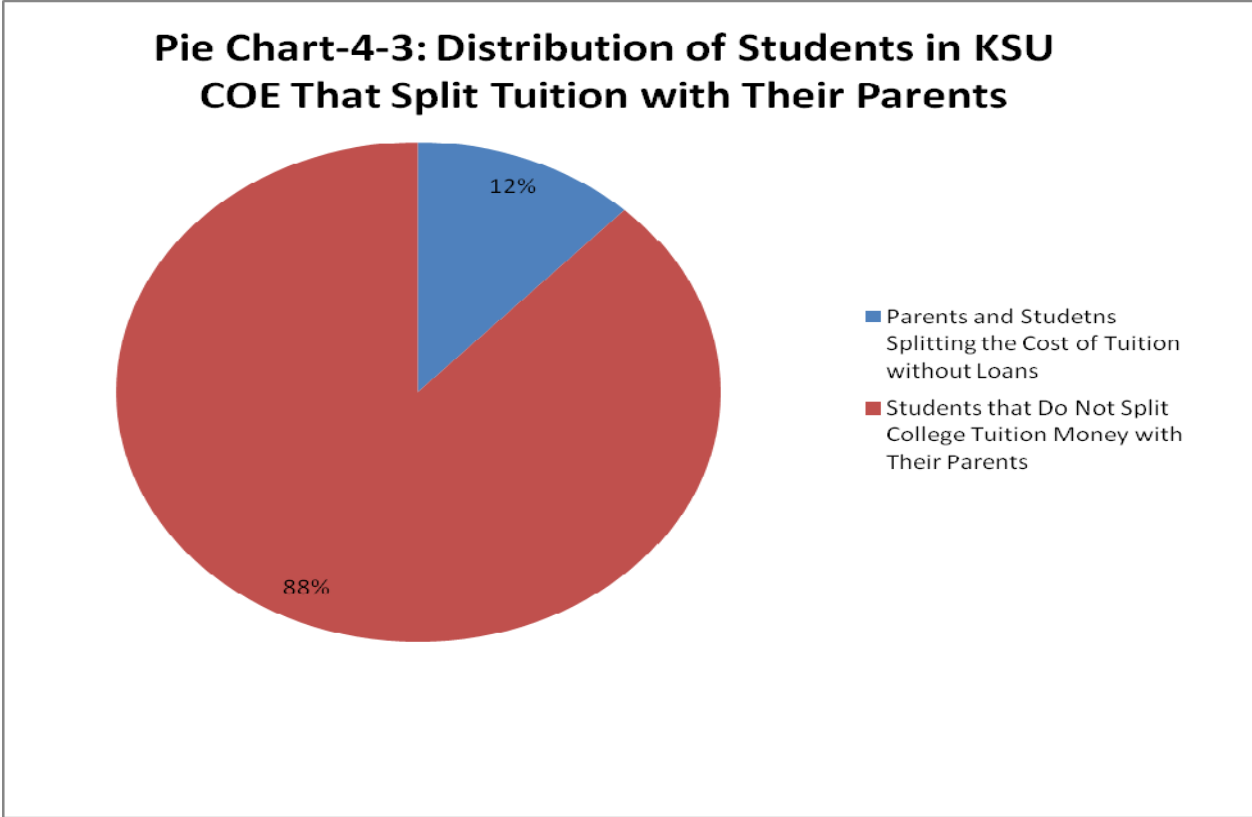
Pie Chart-4-3: Distribution of Students in KSU COE That Split Tuition with Their Parents (SallieMae, 2008)

4.3.1 Students and Parents Dividing Cost with the Help of Loans

For those students who divide the cost of tuition with their parents, 23 reported using some type of student loan. The other 11 students in this group split tuition with current income or savings without any loans. Since only one student split the cost without using any loans, that number, which is 12%, will be used for this report.

4.3.2 Why do Students in the KSU COE have to Divide the Cost of Tuition with Their Parents?

The reason these current students in the KSU COE have to divide the cost of tuition with their parents is that the tuition can be too great for the student or the parent to pay solely. Many times, if a family does not want to take out any type of loan or does not qualify for one, the tuition expense will be split between the parents and the students.

Splitting the cost of tuition between student and parents correlates with the average age of the students sampled. All of these fourth or fifth year college students along with their parents have already invested a lot of money in tuition. It's possible that all these families who split tuition now could have paid before only through the parents or only through the students prior to having to split the cost.

4. 4 Are you using any type of student loans/grants?

Referring back to the national average of how many parents and students borrowed to pay for tuition (23%, 16%), a combined 39% of the families with college students had to borrow funds.

When asked in the questionnaire if the students were using any loans or grants, 53 answered yes and 36 answered no. Thus, many students in the KSU COE are using more financial aid such as loans to finance their education. This means roughly 60% of the students in the KSU COE are using some type of borrowed funds to pay for school.

To find a range of how many students are using some type of loans or grants, the confidence interval is worked out below.

A confidence interval of the number of students whose parents cover tuition is given below.

Step 1: Reference Formula 5

95% C.I.= y_{avg}+or – 1.96σ / $(n)^{1/2}$

y_{avg}=60%
σ=0.5
n=89

Step 2: Substitute Values In the Equation

.60+or – 1.96(0.5) / $(89)^{1/2}$ = (0.50,0 .70)

Step 3: Communicate Results

With 95% Confidence, the number of students in the KSU COE who borrow funds to pay for tuition is somewhere between 50% and 70%. Thus, the 60% from the questionnaire coincides with the ranges of this confidence interval.

Given the national average for the percentage of students who borrow, 39% is a lot lower than the 60% from the KSU COE questionnaire.

The hypothesis test below shows that the percentage of students in the KSU COE who use loans is actually greater than the national average of 60%.

In this test, α is assumed to be 0.5, and standard deviation is assumed to be 0.5.

Step 1: State the Null and Alternative Hypothesis (H_0, H_A) and α Value

(Null Hypothesis) H_0 = The percentage of engineering students at the KSU COE who use student loans or grants is 39%.
(Alternative Hypothesis) H_A = The percentage of engineering students at the Kansas State COE who use student loans or grants for their college tuition is greater than 39%.

Step 2: Calculate the Test Statistic (T.S.)

T.S.= $(y_{avg} - \mu) / (\sigma /n)^{1/2}$

Here,
y_{avg}=53/89 or 60% (Data from the questionnaire)
μ= 39% (the national average)
σ or s= 0.5
n=89

$(60 - 39) / (0.5 /89)^{1/2}$= 280.2 (test statistic)

Once all the values were plugged in and the calculation run, the test statistic turned out to be 280.2.

Step 3: Find the P-Value

Refer to Table-3-1B to find the P-Value for a "z" of 280.2. As the table shows the p-value is going to be approximately zero. The value does not need to be doubled in this example because it is a single sided test.

The test shows very strong evidence that on average the percentage of students in the KSU COE who use some type of student loans or borrowed funds is greater than the national average of 39%.

The distribution of students who borrow funds for tuition in the KSU COE is shown below in *Pie Chart-4-4: Distribution of Students in the KSU COE That Use Loans*. This chart shows that 60% of the students use loans while the other 40% do not.
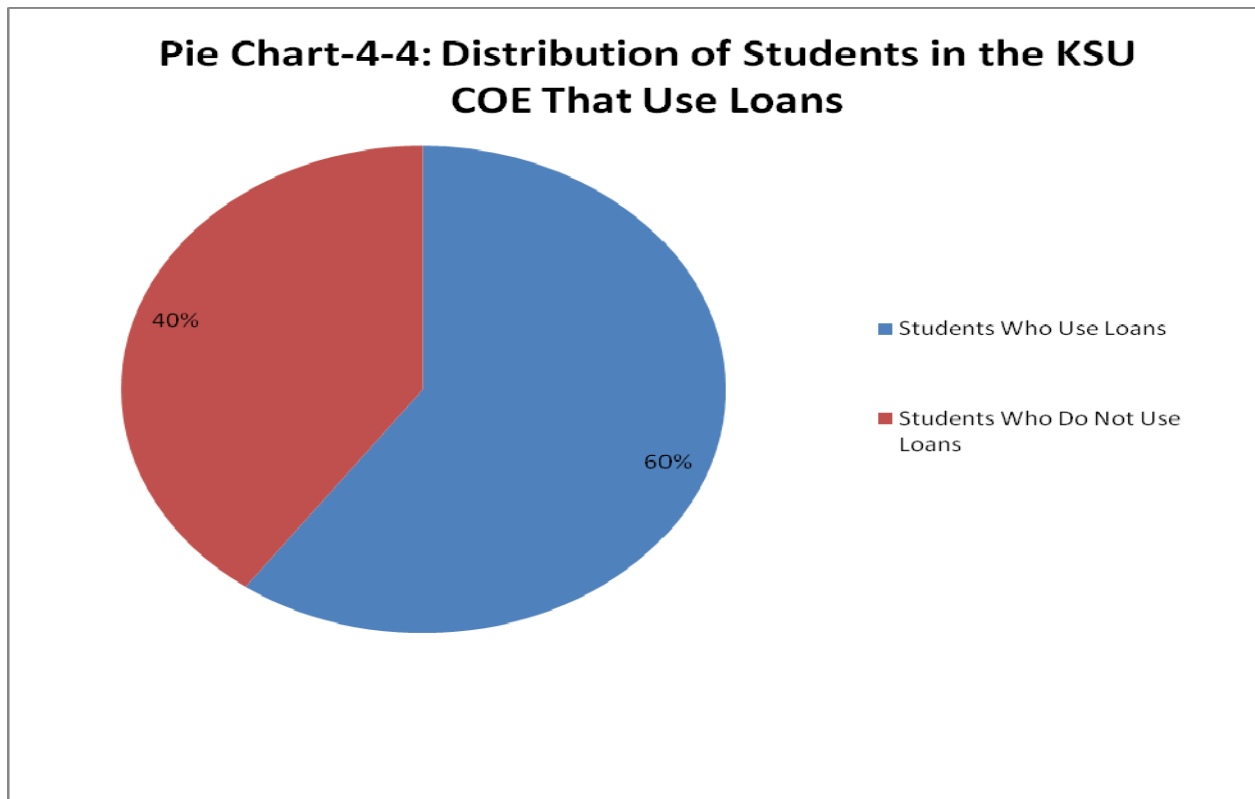
Pie Chart-4-4: Distribution of Students in the KSU COE That Use Loans (SallieMae, 2008)

4.4.1 Reasons Students and Parents Borrow

Students and parents borrow money to pay for college for several reasons. The first one, is if parents and students cannot pay the entire cost of college tuition themselves or together, some

type of funds must be borrowed. Some families might also view paying for college as a responsibility. Then again, some parents feel the student's responsibility to fund education, and on the other hand, students feel it's the parents' responsibility to fund education. Either of those two situations clearly can lead to either the student or the parents borrowing money. Sometimes, it is also a matter of which loans have the lower interest rate. If a student loan has a lower interest rate than a parental loan, that student loan can be taken and paid off faster than that parental loan. Additionally, if the student chooses a school where the tuition is higher than expected or what their parents were willing to pay, this would also be a reason to take out student loans.

4.5 Were You Offered Any Scholarships to Come to Kansas State University?

The next question asked if the student was offered any scholarships to come to KSU, and if so specify which. The purpose of this question is to determine how many students in the KSU COE are awarded some type of scholarship and how many scholarships come from the KSU COE.

The results of the questionnaire showed that 71 of the 89 students sampled were using some type of scholarship. The KSU COE students surveyed all paid full tuition their parents, themselves, or through some type of loan and grant scholarship.

A list of the scholarships these students are using, and the number of students who earned those scholarships is listed on the next page in *Table-4-1: Scholarships Offered to Students in the Kansas State University College of Engineering*. This table shows the total number of scholarships offered to these 89 students which is 103. This means many of those 71 students have more than one scholarship. The distribution of scholarships shows the KSU COE gave out the most, 24 general scholarships. A general KSU COE scholarship in this case indicates the student answered yes to having a KSU COE scholarship but did not specify which one. Some other scholarships on this list are from faculty or companies associated with the COE such as the Chuck and Linda Burton Scholarship and the Coonrad Leadership Scholarship. The biggest distinction on the list is the number of scholarships offered by the KSU COE and the number in general offered by KSU. More scholarships from the KSU COE and others from KSU exist compared to the number of students in this sample. These numbers, 24 and 15, show that the KSU COE as well as KSU in general are trying to distribute out the scholarships to as many deserving students as possible.

Scholarship Name	Number of Students
KSU COE General Scholarship	24
Putnam	9
KSU Leadership	8
Engineering Day Scholarship	1
Midwest Student Exchange	6
Other KSU General Scholarship	15
Medallion Scholarship	3
Activity Scholarship	3
Presidential Scholarship	1
Tointon Scholarship	1
Church Scholarship	1
4-H Scholarship	2
Bright Flight (ACT) Scholarship	2
Foundation Scholarship	11
Chuck and Linda Burton	1
Rathbone Scholarship	1
Coonrad Scholarship	1
AFRTOC Scholarship	6
Anderson Award	2
Millenium Scholarship	3
KSU Marching Band	1
Transfer Scholarship	1
Total Scholarships Offered	**103**

Table-4-1: Scholarships Offered to Students in the Kansas State University College of Engineering

This scholarship listing has a distribution shown in *Graph-4-1: Scholarships Offered to Students in the KSU COE*.
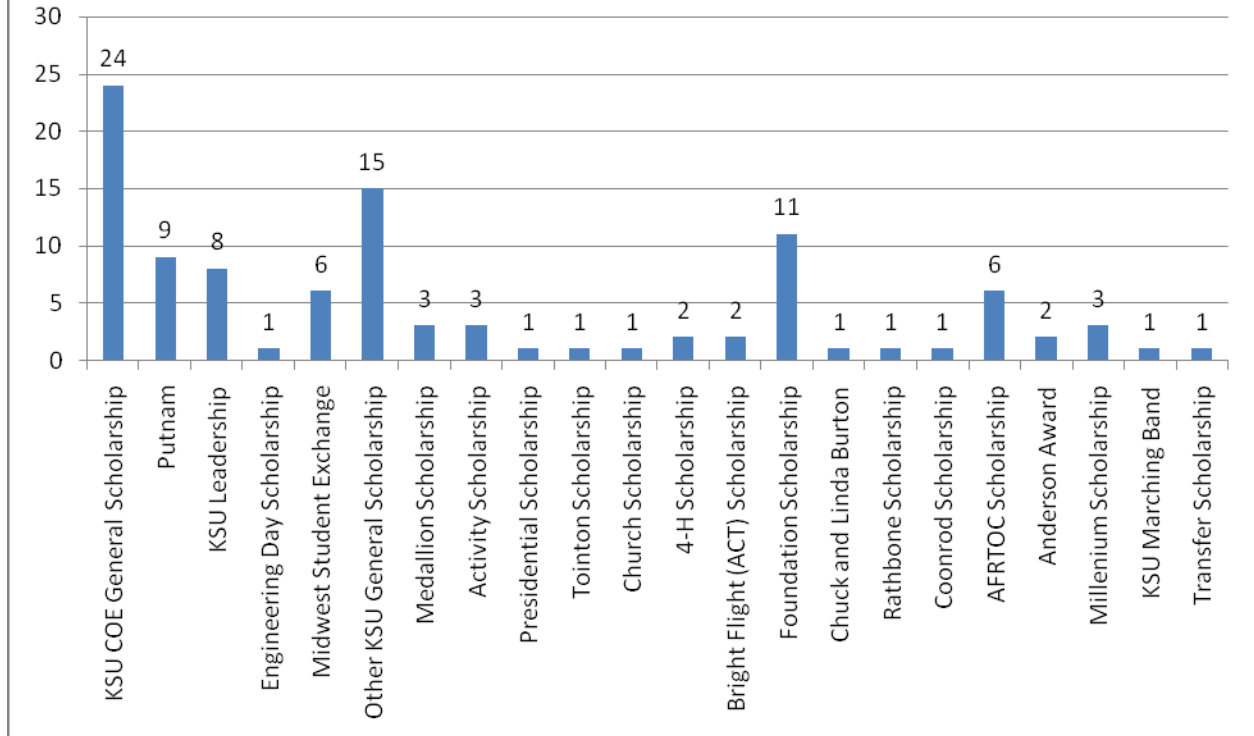
Graph-4-1: Scholarships Offered to Students in the KSU COE

No statistical tests were done to determine how many students in the KSU COE have scholarships compared to the national number since the national number consists of degrees. In addition, the students in the national survey used scholarships and grants to pay for their entire tuition while the students in the KSU COE used scholarships to assist in paying for tuition; therefore, making a hypothesis test or a confidence interval would generate inaccurate results.

4.6 If You Don't Pay Solely, If Your Parents Don't Pay Solely, If You and Your Parents Don't Divide the Cost, and If You Not Using Scholarships, How Is Your Tuition Paid For?

No student had to answer this question because everyone was paying by one of the methods listed:

- Student Pays Solely For Tuition
- Parents Pay Solely For Tuition
- Parents and Students Divide the Cost
- Students Use of Student Loans or Grants
- Students earned Scholarships

In comparing this payment method to the national survey, this would be under the "friends and relatives support" for tuition payment. Looking at the national average of 3%, it's no surprise the number is so small in the student sample in the KSU COE, either. In this case no students paid by this method.

Since no student from the sample paid by some "other" method, no statistical tests can be done here with a hypothesis test and confidence interval. The main point is that very few students pay via these other methods as the questionnaire and the national survey show.

4.7 Summary of Payment for Students in the Kansas State University College of Engineering

To generalize about the students in the KSU COE, *Pie Chart-4-5: Distribution of Payment Methods for Students in the KSU COE*, shows the distribution of the payment methods described above.

This graph shows many of these students, aside from those who pay solely for tuition or have their parents pay solely for tuition, use multiple methods of payment to cover the cost of college. As stated in the earlier section, many of these students are using some type of scholarship to help pay for tuition. But, no-one in this student sample could cover the entire cost of tuition with scholarships only. Instead, 60% of these students sampled had to borrow funds of some kind to pay for tuition. This shows many of these students' parents either cannot afford to pay for all or possibly any of the college tuition, so the students take out loans. Again, the age of these students has an effect on why they have to borrow money. Thus, fourth or fifth year college students are far more likely to have to borrow funds in comparison to a freshman or sophomore in college because of appropriated money already having been spent on tuition.

Some of these students, 22%, had their parents pay solely for their education because these parents can still afford it. Of the remaining students, 6% had to pay solely for college and did

not want to take out any students loans to do so. The other 12% found splitting the cost of tuition with their parents the best way to finance their college education.
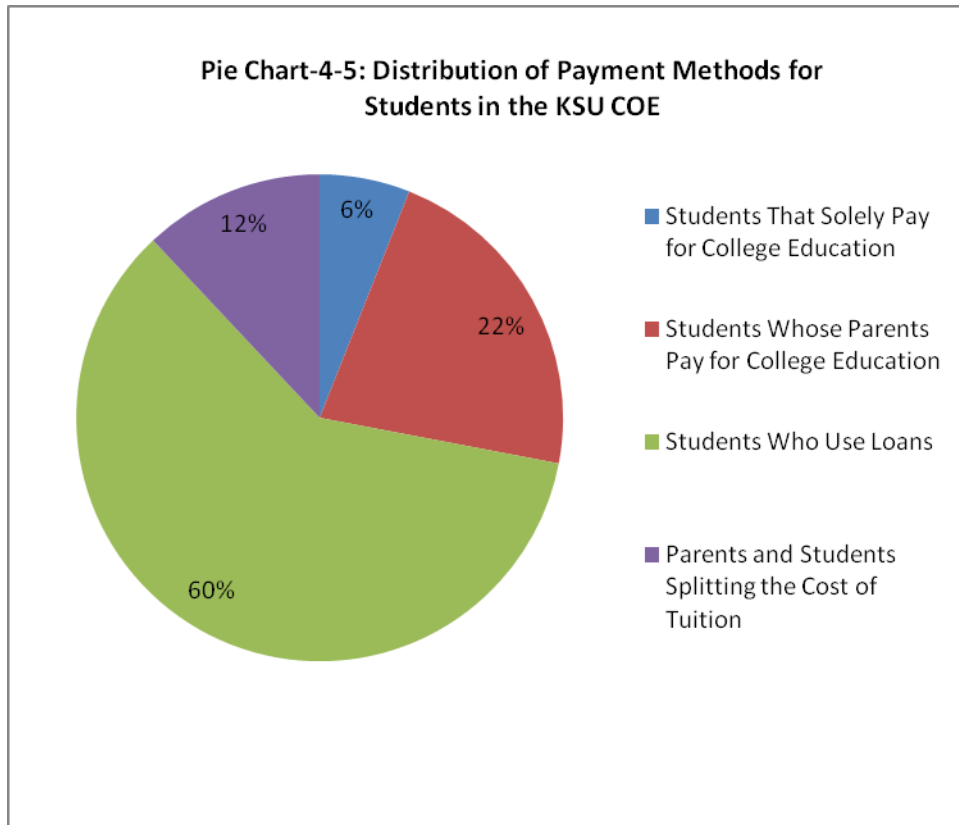
Pie Chart-4-5: Distribution of Payment Methods for Students in the KSU COE

4.8 How Does the Cost of an Undergraduate Engineering Education at Compare to Other Universities in Kansas? The Midwest?

The final financial based question the students were asked on the questionnaire was

"When you were exploring colleges, did you find studying engineering at KSU to be more affordable than other universities?"
  o   If yes, indicate which other colleges you explored.
  o   If KSU was more affordable, was that the main reason for coming?

Of the 89 students surveyed, 34 answered that an undergraduate engineering education at KSU was more affordable than at the other colleges they explored.

Those students who said KSU was more affordable than other colleges visited and mentioned, the other schools visited below.

1. The University of Missouri
2. The University of Kansas
3. The University of Missouri-Rolla
4. Iowa State University
5. Washburn University
6. Colorado School of the Mines
7. Wichita State University
8. Louisiana Tech University
9. The University of Nebraska

Of the 34 students who said KSU was more affordable than these other schools, only 9 of them said that was the main reason for coming to KSU; the remaining 24 had a different reason. The main reasons are listed and described in a later section of this report.

The exact amount of tuition for all of the colleges and universities mentioned was not asked for on the questionnaire. The students were asked to list the other schools only to give a relative idea of the cost comparison.

5.0 Current Student Background Information

The following section describes the background of the current students in the KSU COE based on a series of personal questions whose responses are summarized below.

5.1 Are You the First Person in Your Family to Go to College?

The first question regarding personal background was

"Were you the first person in your family to go to college?"
   a. If no, who in your family has gone to college and received a degree?

To this question, 13 answered yes, and 76 answered no. Of those 76 students who were not the first to go to college, 6 are first generation college students. A first generation college student in this case means that the student's grandparents or parents did not attend college. Given that 76 of those 70 are not first generation, clearly if parents go to college and get an

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education, it is far more likely that their child will go to college. This isn't always the case, but most of the time it is. This information is shown in *Table-5-1: Family's Education and Student Classification*.

To find out if being a college student in the KSU COE is dependent on these student's parents having a college education, a dependence test was run.

Student's Classification	Family's Education		Total
	Non-College	College	
First Generation	13	6	19
Non First Generation	70	0	70
Total	83	6	89

Table-5-1: Family's Education and Student Classification

Step 1: State the Null and Alternative Hypothesis (H_0, H_A) and α Value

Null Hypothesis (H_0): Student classification in the KSU COE and their parents' education are Independent

Alternative Hypothesis (H_A): Student classification in the KSU COE and their parents' education are dependent

α Value is assumed to be 0.5

Step 2: Calculate the Expected Frequencies

Column Identification (Non-college=1; College=2)
Row Identification (First Generation=1; Non First Generation=2)

Expected Frequencies:

E_{11} = (19*83)/89=17.7
E_{21} = (70*83)/89=65.3
E_{12} = (6*19)/89=1.28
E_{22} = (6*70)/89=4.72

Step 3: Sum the Expected Frequencies to get X^2 Value

X^2= 17.7+65.3+1.28+4.72=89.0.0

Step 4: Find Degrees of Freedom

DF= (r-1)(c-1)=(2-1)(2-1)=2

r=2
c=2

Step 5: Go to Table 2B and Find P-Value

For one degree of freedom, the P-value is going to be extremely small. The value 89.0 does not even show up on the table for the column of 0.001. This P-value being extremely small is going to render an α value of less than 0.05 so the null hypothesis, H_0, can be rejected.

Step 6: State Results

Therefore, as a result of this dependence test, extremely strong evidence exists that student classification in the KSU COE is dependent on the parents' educational level.

5.2 Reasons for Coming to Kansas State University College of Engineering

The next section asked the students for their reasons for coming to the KSU COE. The main question asked of the students was

10. Were the academic programs offered by the College of Engineering the main reason you came to K-State?
    a. If no, what was the biggest reason?

Of the 89 students sampled, 54, which is 60%, said the main reason they came to the KSU COE was the academic programs. The results of this question show the academic programs offered in the KSU COE are an important reason many students come to KSU.

Other reasons students came to KSU included having had a friend or family member here who had already been successful and enjoyed their college experience, which represented 5% of the sample. Also, 30% noted they liked the general atmosphere of KSU when they visited, which

means the positive feeling they got from campus. In particular, such students remarked on how friendly the people were on campus and how helpful everyone was. The students also remarked on how many activities there were able to get involved in and commented positively that KSU had more girls than the University of Missouri Rolla. Reasons like this also speak to general atmosphere. Some other reasons students chose KSU was the sports programs or that they were a fan since they were young, representing 5% of the group. This shows sports and any given sports team associated with a certain college can persuade a prospective student to join.

5.3 Did you Transfer to Kansas State University From a Community college?

The next questions asked of the students were
> 11. Did you transfer to KSU from a Community college?
>> a. If yes, what community college was it?
> 12. If you attended community college, why did you start there?

When the students were asked if they started at community college before coming to KSU, 5 answered yes, and the remaining 84 answered no, which is around 6% of this sample.

The community colleges attended by the students in this sample were
1. Johnson County Community College
2. Seward County Community College
3. Butler Community College

The following reasons were given for starting at community college
- Classes were smaller
- High school counselor recommended community college
- I wanted to keep playing sports
- My high school had a program where I could get the first two years free at community college if I participated
- I wasn't ready for a big school

Surprisingly, only one reason addresses finances, the one that discusses two years free community college. Many high schools have such programs; for instance, the Lee's Summit R-7 School District in Lee's Summit, MO has the "A+ Program" that requires students to perform thirty hours of community service a semester, and in return they will get two years free at the neighboring community college. But, one potential drawback is that some classes taken at

community college will not transfer to a four year university. Many students have had to finish a semester later than planned because they started at community college and couldn't take the necessary class work to graduate on time or because some credits did not transfer. Furthermore, if no credits transfer and the student ends up going to a four year school, he or she must start from the very beginning and pay tuition for all four years.

The other reasons students attended community college perception and comfort. Smaller class sizes give the student more individualized attention as well a similar classroom setting to high school. Not being ready for a big school and having a counselor recommending a student to start at a community college is another factor that suggests comfort, this time with the learning environment. If students are uncomfortable with their learning environment, their chances for success diminish. The final reason students gave is that they wanted to attend community college just for fun. Lastly, student from this questionnaire wanted to keep playing sports from high school and was offered a scholarship to run track at community college.

5.4 What High School Did You Attend and Where is it Located?

The final question asked of the students was

"What high school did you attend and where is it located?"

The purpose of this question was to see where currently the KSU COE is drawing their student population. The Tables listed on the following pages show where the students are from and what high school they attended.

Table-5-2: Current Cities for Present Students From Kansas in the Kansas State University College of Engineering

Table-5-3: Current Cities for Present Students From Missouri in the Kansas State University College of Engineering

Table-5-4: Current Cities for Present Students From Nebraska in the Kansas State University College of Engineering

Table-5-5: Current Cities for Present Students From Texas in the Kansas State University College of Engineering

Table-5-6: Current Cities for Present Students From Oklahoma in the Kansas State University College of Engineering

Table-5-7: Current Cities for Present Students From Minnesota in the Kansas State University College of Engineering

City	2000 Population	High Schools Attended
Andover (Suburb of Wichita)	6,698	Andover High School
Atwood	1,279	Rawlins County High School
Axtell	427	Axtell High School
Bern	204	Bern High School
Burlington	2,790	Burlington High School
Cimarron	1,934	Cimarron High School
Garden City	28,451	Garden City High School
Garden Plain (Suburb of Wichita)	797	Garden Plain High School
Great Bend		Great Bend High School
Highland (Very Near St. Joeseph, MO)	976	Doniphan West High School
Hoyt (Suburb of Topeka)	571	Royal Valley High School
Hugoton	3,708	Hugoton High School
Hutchinson	40,787	Central Christian High School
Independence	9,846	Independence High School
Kingman	3,387	Kingman High School
Kinsley	1,658	Kinsley High School
Lakin	2,316	Lakin High School
Leavenworth (Suburb of Kansas City, KS)	35,420	Leavenworth High School
Lenexa (Suburb of Kansas City, KS)	43,434	St. Thomas Aquinas High School
Lindsborg	3,321	Smoky Valley High School
Louisburg	2,576	Louisburg High School
Manhattan	51,707	Manhattan High School
McPherson	13,770	McPherson High School
Nickerson	1,194	Nickeron High School
Olathe (Suburb of Kansas City, KS)	92,962	Olathe South High School, Olathe Northwest High School, Olathe East
Overland Park (Suburb of Kansas City, KS)	111,790	Shawnee Mission South High School, Shawnee Mission West High School, St. Thomas Aquinas High School, Blue Valley Northwest High School, Shawnee Mission Northwest High School
Plainville	2,029	Plainville High School
Pratt	6,570	Pratt High School
Roeland Park (Suburb of Kansas City, KS)	6,817	Bishop Miege High School
Sabetha	2,589	Sabetha High School
Silver Lake (Suburb of Topeka)	1,358	Silver Lake High School
St. George (Near Manhattan, KS)	434	Rock Creek High School
St. Mary's (Near Manhattan, KS)	2,198	St. Mary's Academy
Stafford	1,161	Stafford High School
Stilwell (Suburb of Kansas City, KS)	5,373	Blue Valley High School
Topeka	122,113	Washburn Rural High School
Wamego	4,246	Wamego High School
Waterville	681	Valley Heights Junior/Senior High
Wellsville	1,606	Wellsville High School
Wichita	344,284	Wichita Heights High School, Bishop Carroll High School
Winfield	11,861	Winfield High School

Table-5-2: Current Cities for Present Students From Kansas in the Kansas State University College of Engineering

The 2000 census for Kansas shows a mix of students attend the KSU COE from big urban areas of greater than 100,000 people to smaller towns. These results show the KSU COE is attracting many prospective college students in their home state from high schools of all sizes. These results also show there is a fair distribution of students from low populated areas as well as the more populated areas of the State.

Something that might be misleading about *Table-5-2* above, many of the cities listed are also considered suburbs of larger cities with overall populations of 1,000,000 or greater; however, population is listed only for the suburb and not the bigger city. This means students from these suburbs are actually coming from a larger area than is indicated. The surrounding suburbs of Kansas City, KS are a great example of this point: Stilwell, Overland Park, Olathe, Roeland Park, Leavenworth, and Lenexa. The combined population for all these cities is less than the entire 2000 population of Kansas City, KS (475,830).

This table also shows the high schools that the students attend. Thus, the population numbers of each of these cities can suggest the relative class size of the high school.

City	2000 Population	High Schools Attended
Independence (Suburb of Kansas City)	110,704	Fort Osage High School
Lee's Summit (Suburb of Kansas City)	92,927	Lee's Summit North High School
Liberty (Suburb of Kansas City)	28,528	Liberty High School
St. Louis	348,189	Layfayette High School, Vianney High School, Bishop DuBourg High School

Table-5-3: Current Cities for Present Students From Missouri in the Kansas State University College of Engineering

The table above represents the areas for six students from the questionnaire that came from the State of Missouri. All of these students came from a large metropolitan area in either Kansas City or St. Louis. KSU COE offers two programs to Missouri prospective students that draw many of them here. First, is the Missouri Reciprocal program which offers in-state tuition for the prospective student. Second, is the Midwest Student Exchange Program enabling Missouri residents who wish to study a specific major (in the KSU COE this is architectural

engineering) to have their tuition payment cut in half. This questionnaire did not ask if these students came because of the reciprocity they earned with tuition, but the program is still a major reason Missouri students come to Manhattan.

City	2000 Population	High Schools Attended
Omaha	241,183	Millard North High School
Papillion (Suburb of Omaha)	16,363	Papillion LaVista High School

Table-5-4: Current Cities for Present Students From Nebraska in the Kansas State University College of Engineering

Like the students from Missouri, the table representing two students coming from Nebraska, the Omaha area, shows similar results. Second only to Lincoln, this is the largest city in the State. Again, just like with Missouri, many students could have come to KSU because they got in-state tuition but that is probable from the questionnaire.

City	2000 Population	High Schools Attended
San Antonio	1,336,040	Randolph High School
Austin	757,688	Iowa Park High School

Table-5-5: Current Cities for Present Students From Texas in the Kansas State University College of Engineering

The next table above shows the cities in Texas that KSU draws students from. This sample had one student each from San Antonio and Austin, both large cities which reflects the continuing trend of drawing out-of-state students from big cities.

City	2000 Population	High Schools Attended
Oklahoma City	547,274	Odessa High School

Table-5-6: Current Cities for Present Students From Oklahoma in the Kansas State University College of Engineering

For the students from Oklahoma, the trend still holds as shown in the table above. One student in this sample came from the capital, Oklahoma City, which is the State's largest city.

City	2000 Population	High Schools Attended
Savage (Suburb of Minneapolis)	25,065	Prior Lake High School

Table-5-7: Current Cities for Present Students From Minnesota in the Kansas State University College of Engineering

The final table above references the one student coming from Minnesota. This student came from a suburb of Minneapolis, which is also a large metropolitan area.

The general trend with out-of-state students in the KSU COE is that all these students are from large cities. That could be a combination of two things. First, KSU COE gets more marketing or exposure in large cities and less in smaller communities in other states. Second, many graduates of the KSU COE who start careers in other states tend to go to the larger cities, which results in exposure for KSU.

6.0 Student and Parent Attitudes with College Spending

The Sallie Mae report gives many reasons why students and parents invest so much in higher education. This section breaks apart the specific reasons that students and parents invest in college, which are taken directly from, "How America Pays for College". This part of the Sallie Mae report took a student sample and parent sample and asked a series of questions. The responses were rated as "strongly agree" or "strongly disagree" for each statement.

The students were asked the following statements:
    I am willing to stretch myself financially to obtain the best opportunity for my future.
    I'd rather borrow money to go to college than not go at all.
    College is definitely worth the cost.
    College is an investment in my future.

The parents were asked the following statements:
    I am willing to stretch myself to provide the best opportunity for my child.
    I would rather borrow to pay for college than have my child not go at all.
    Students should pay their own way through school.

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I let my child choose the college he or she wanted and did not discourage choices based on cost.

For my family, community college is a more attractive higher education.

College is definitely worth the cost.

College is not affordable for my family.

Saving for retirement is more important than paying for my child's college education.

College is an Investment in my child's future.

Assisting my aging parents financially has reduced my ability to pay for my child's college education.

6.1.1 Student Reasons For College Spending

This subsection shows how the students responded to the statements asked of them above.

6.1.2 I Am Willing to Stretch Myself Financially to Obtain the Best Opportunity for My Future.

The breakdown of how the students responded to this question is listed below

- Strongly Agree=59%
- Agree=28%
- In Between=10%
- Disagree=2%
- Strongly Disagree=1%

Many of these students think that stretching financially to go to college for investment in the future is well worth the cost. This percentage also reflects how many students take out loans to pay for college. That combined 77% of students who feel it's worth borrowing funds for college also reflects that 60% of students in the KSU COE and the 39% of college families nationally. This distribution is shown below in *Pie Chart-6-1: Distribution of Students to Stretch Financially*.
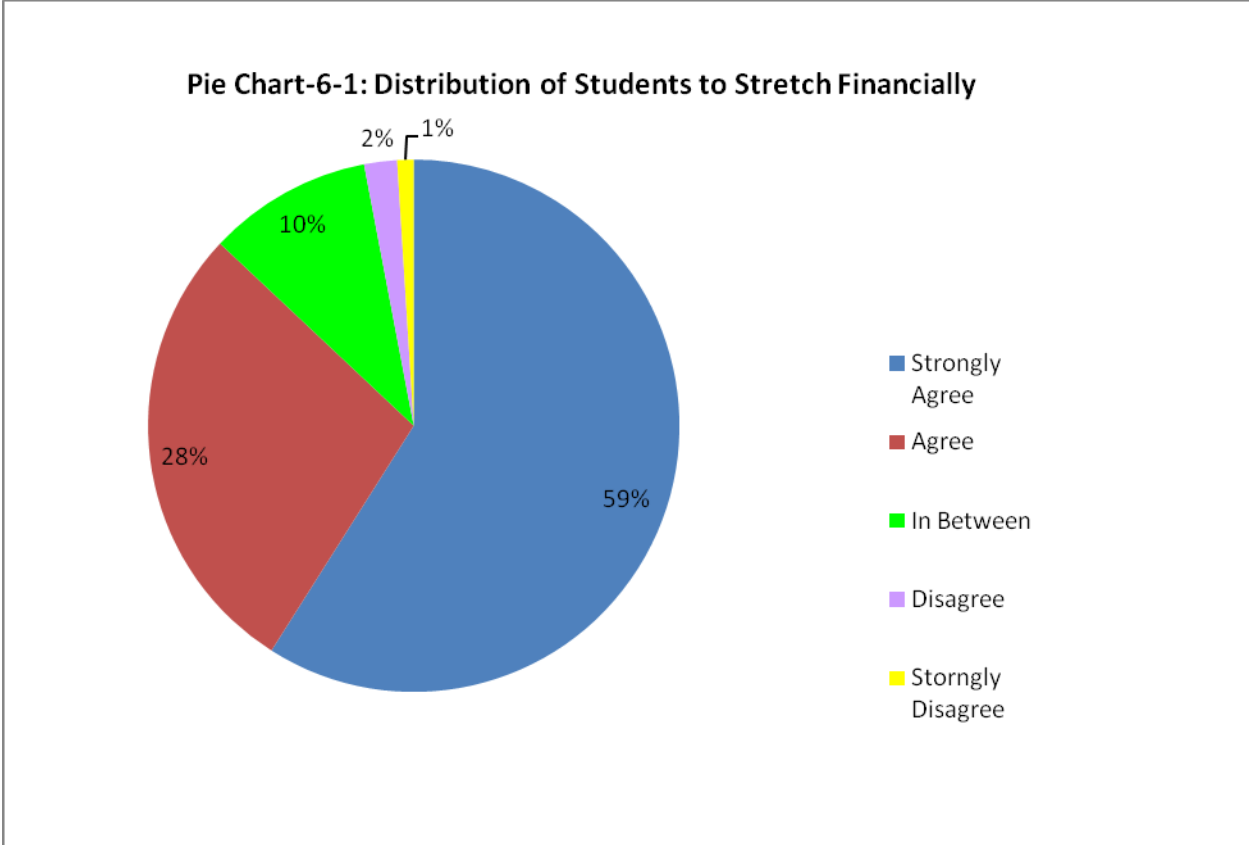
Pie Chart-6-1: Distribution of Students to Stretch Financially (SallieMae, 2008)

6.1.3 I'd Rather Borrow Money to Go to College than Not Be Able to Go at All.

For the second statement the students' reactions were as follows:
- Strongly Agree=67%
- Agree=20%
- In Between=9%
- Disagree=2%
- Strongly Disagree=2%
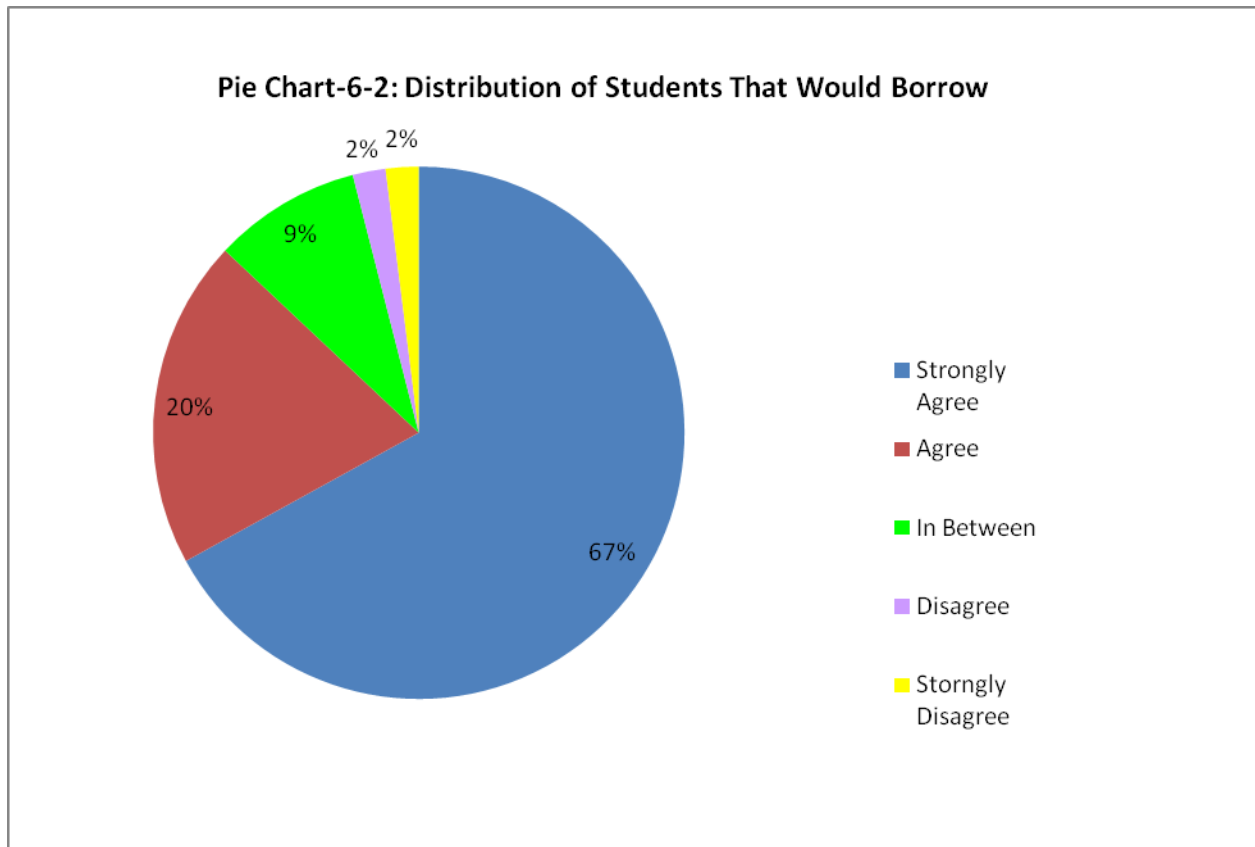
Pie Chart-6-2: Distribution of Students That Would Borrow (SallieMae, 2008)

The results of this second statement also show how much these students believe college is worth the cost and how willing student's are to get an education. Results of responses to this statement are very close to those for the previous one about stretching financially to pay for college. The national percentage of students and those of the KSU COE correlate. This distribution is shown above in *Pie Chart-6-2: Distribution of Students That Would Borrow*.

6.1.4 College is Definitely Worth the Cost

For the third statement, the students' reactions were as follows:
- Strongly Agree=61%
- Agree=23%
- In Between=13%
- Disagree=2%
- Strongly Disagree=1%

Again, the results of this third statement show that these students are willing to invest a lot of money if it means getting a college education. Meantime, on the national level, 97% of students considered college a good investment. The questionnaire did not ask the students in the KSU COE if they thought their education was worth the cost or not, only their reasons for going to KSU, which are described in the next subsection. This distribution is shown below in *Pie Chart-6-3: Distribution of Students That Think College is Worth the Cost*.
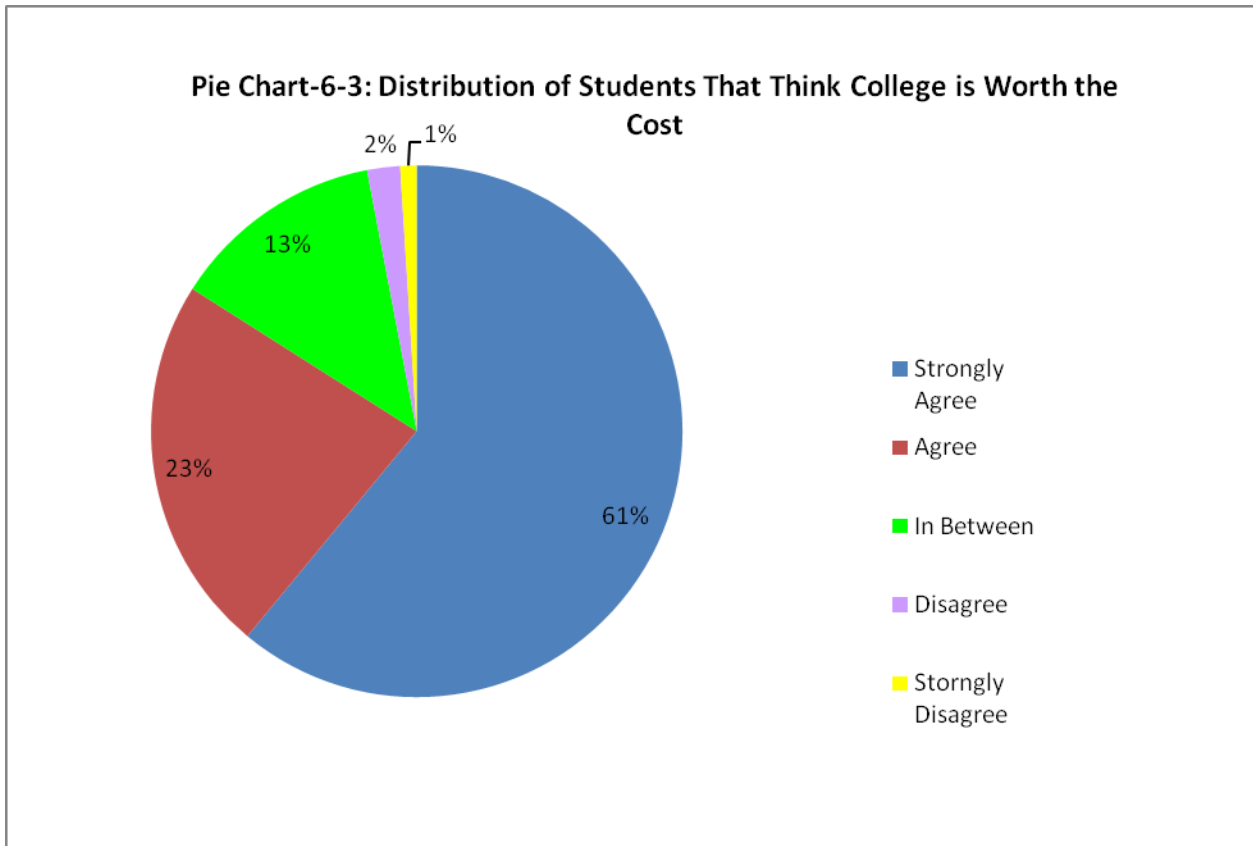
Pie Chart-6-3: Distribution of Students That Think College is Worth the Cost (SallieMae, 2008)

6.1.5 College is an Investment in My Future

For this statement, the students' reactions were as follows:
- Strongly Agree=84%
- Agree=12%
- In Between=3%
- Disagree=1%
- Strongly Disagree=0%
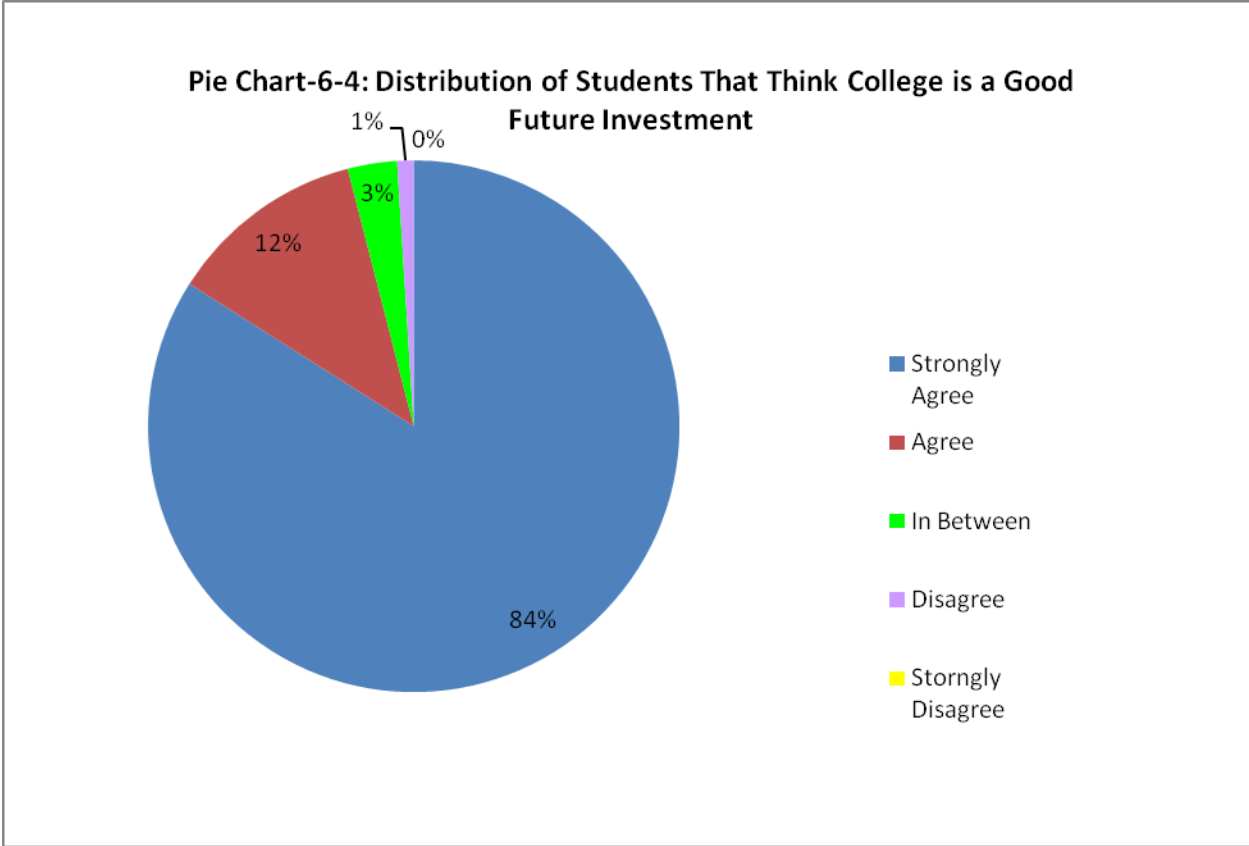
Pie Chart-6-4: Distribution of Students That Think College is a Good Future Investment (SallieMae, 2008)

This statement sums up the previous four. Almost all these students thought that getting a college education was very important to their future success. For those students on the national level, the reasoning for going to college was given as "an investment in the future." The survey did not specify any particular reason for choosing a certain college over another or what factors these students considered other than cost. However, the students in the KSU COE gave many reasons for going to KSU. Above all was the reputation of the academic program in the KSU COE and the opportunities an engineering degree can permit in the future. Other reasons were the "accessible" atmosphere that KSU has the activities to get involved with, and prior family members having had successful college experiences at KSU. This distribution is shown above in *Pie Chart-6-4: Distribution of Students That Think College is a Good Future Investment*.

6.2 Parent Reasons For College Spending

This subsection shows how the parents responded to the statements asked of them as listed in Section 7.0.

6.2.1 I Am Willing to Stretch Myself to Provide the Best Opportunity for My Child

For the first statement the parents' reactions were as follows:
- Strongly Agree=51%
- Agree=24%
- In Between=18%
- Disagree=6%
- Strongly Disagree=1%

The responses to this statement show that 75% of the parents sampled are willing to stretch their finances to pay for their child's college tuition. This statement ties into the next one about borrowing. This distribution is shown below in *Pie Chart-6-5: Distribution of Parents That Will Stretch Financially to Provide The Best Opportunity for Their Child*.
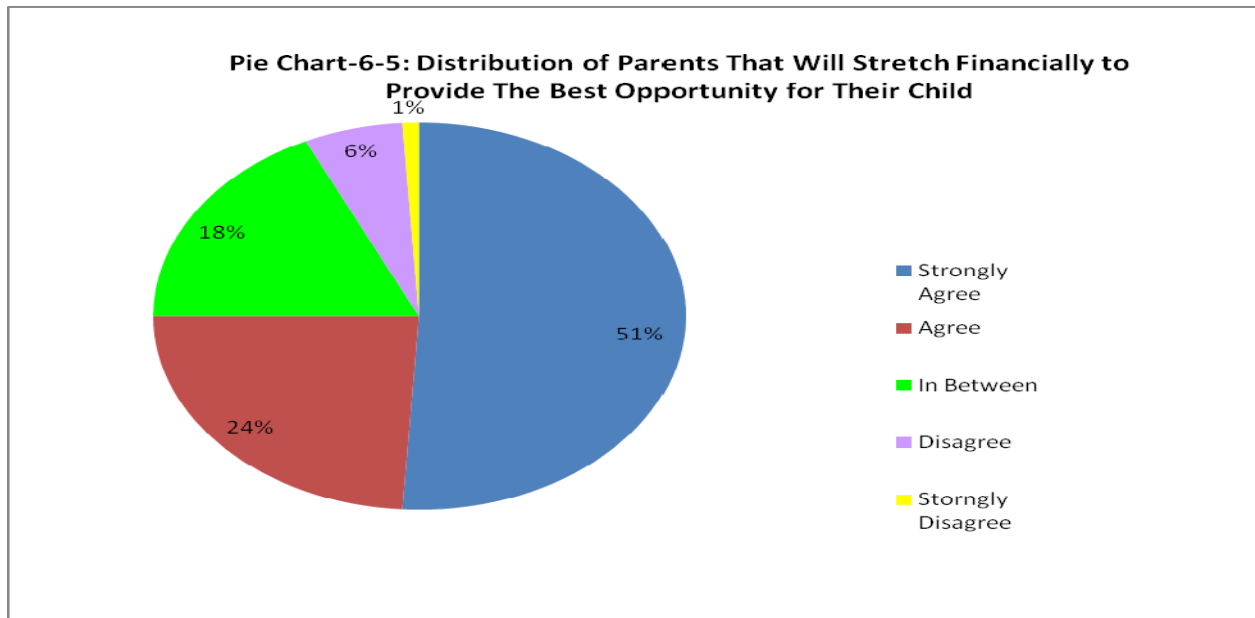
Pie Chart-6-5: Distribution of Parents That Will Stretch Financially to Provide The Best Opportunity for Their Child (SallieMae, 2008)

6.2.2 I Would Rather Borrow to Pay for College Than Not Be Able to Go at All.

For the second statement, the parents' reactions were as follows:
- Strongly Agree=56%
- Agree=21%
- In Between=12%
- Disagree=7%
- Strongly Disagree=4%

Comparing the results of this statement to those of the previous one, roughly the same number of parents say that they would rather borrow loans than not have their child go to college. The 77% of these parents who are willing to borrow funds parallels the 75% who say they would stretch their finances for their child to go to college. The two concepts are directly related. This distribution is shown below in *Pie Chart-6-6: Distribution of Parents That Would Borrow to Go to College*.
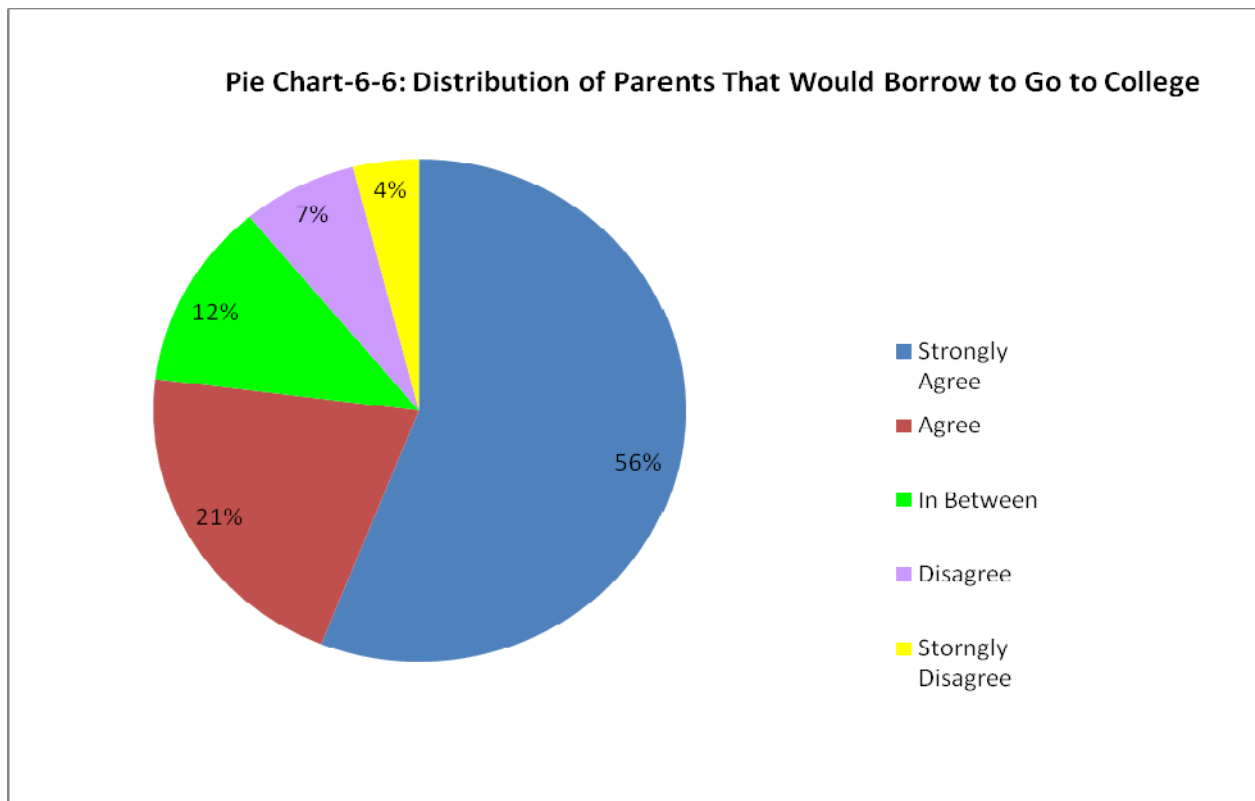
Pie Chart-6-6: Distribution of Parents That Would Borrow to Go to College (SallieMae, 2008)

6.2.3 Students Should Pay Their Own Way Through School

For the third statement, the parents' reactions were as follows:
- Strongly Agree=9%
- Agree=13%
- In Between=43%
- Disagree=18%
- Strongly Disagree=17%

The results of this question are nearly split. A little under half of the parents surveyed say their child should pay their own way through school. This could be for many reasons. Maybe the parents can't afford to pay for college at all, so if their child wants to go to college, the responsibility of paying for it goes to them. Another reason could be a responsibility and money management drill. If parents have their children paying for their own education, it forces them to budget their own finances and be prepared to handle their own once they graduate.

On the other hand, just a little over half of these parents do not believe their child should have to pay their way through college, and there are many reasons for this. If parents can afford to pay for a college education for their child, most of them will. As stated earlier, many high school students won't have enough money to pay for college by themselves. If these students are forced to pay for college, they likely have to take out loans and maybe get a job to cover tuition. If possible, many parents will try to avoid extra stresses on their child like working or borrowing loans when they are starting college. That's why many parents will cover tuition for their child.

6.2.4 I Let My Child Choose the School He or She Wanted and Did Not Discourage Choices Based on Cost

For the fourth statement, the parents' reactions were as follows:
- Strongly Agree=46%
- Agree=19%
- In Between=16%
- Disagree=13%
- Strongly Disagree=6%

For this statement, a majority of the parents, 65%, said that their child could choose a college regardless of cost. The results of this question show two things. Certain degree programs are

only offered at certain schools, so if the prospective student chooses such a major, the number of prospective schools decreases; second, tuition likely increases. Given the responses to this question, most parents are willing to overlook cost, if possible, and let their child go to the college of their choice. This distribution is shown below in *Pie Chart-6-7: Distribution of Parents That Let Their Child Choose a College Regardless of Cost*.

Pie Chart-6-7: Distribution of Parents That Let Their Child Choose a College Regardless of Cost (SallieMae, 2008)

6.2.5 For My Family, Community College is a More Attractive Higher Education

For the fifth statement, the parents' reactions were as follows:
- Strongly Agree=41%
- Agree=23%
- In Between=18%
- Disagree=9%
- Strongly Disagree=9%

The results of this statement show most of these parents think that community college or community college is a more attractive higher education. These 64% of parents are looking at higher education from the perspective of spending. Community college is a lot less expensive than a four year school. Although getting a four year undergraduate degree can't be done at a community college, many parents will look at the idea of having their son or daughter start at a community college and then transfer to a four year school to save some money. This distribution is shown below in *Pie Chart-6-8: Distribution of Parents That Think Community College is a More Attractive Higher Education Option*.
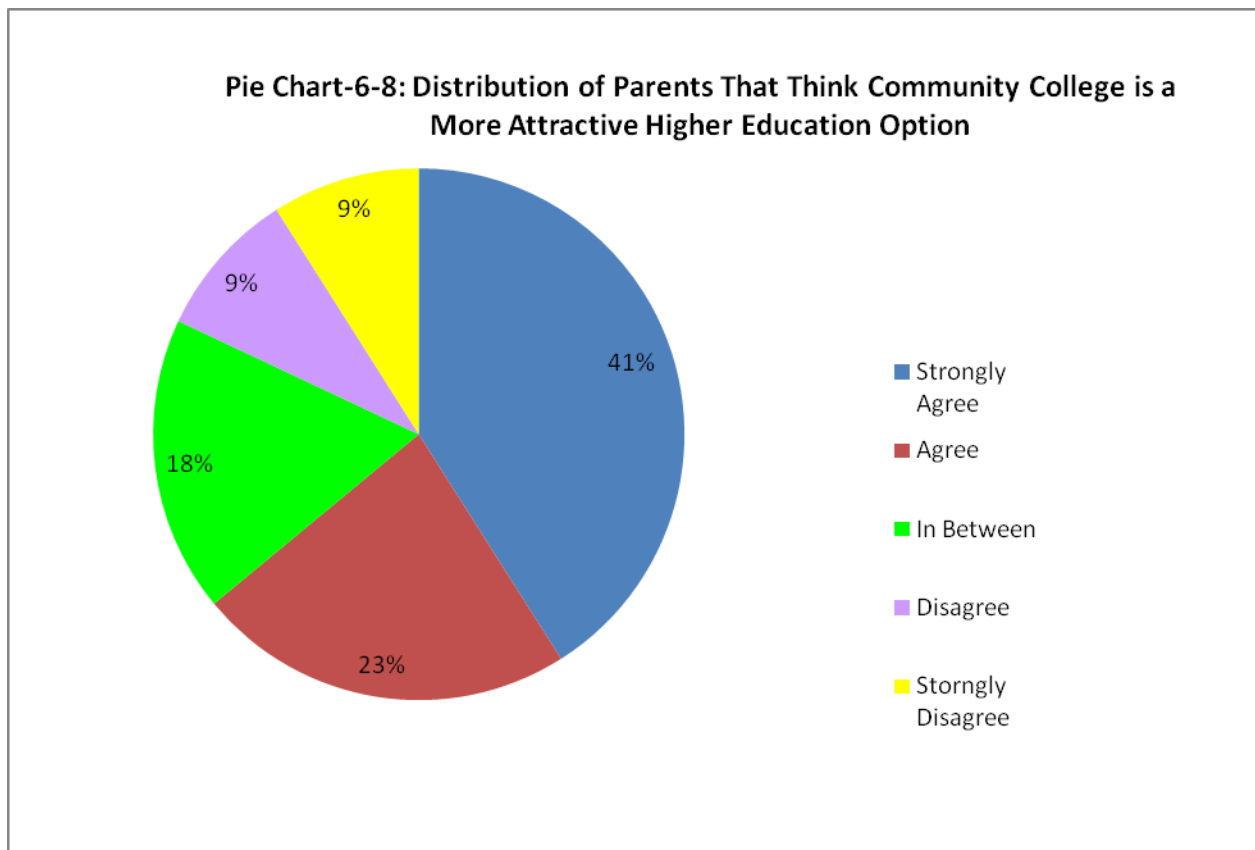
Pie Chart-6-8: Distribution of Parents That Think Community College is a More Attractive Higher Education Option (SallieMae, 2008)

6.2.6 College is Definitely Worth the Cost

For the sixth statement, the parents' reactions were as follows:
- Strongly Agree=47%
- Agree=30%
- In Between=16%
- Disagree=6%
- Strongly Disagree=1%

Most parents feel the same way about college as the students do; 77% of the parents surveyed said that college is definitely worth the cost of tuition. This is less than the number of students who said college was worth the cost, but that could be for any number of reasons. Some of these parents might find they can't afford to pay college tuition. Maybe some of these parents didn't have a college education; therefore, they might not feel college is worth the cost. Some parents might feel their child is majoring in something other than what their parents want, which would not make tuition worth paying for. Overall though, most of these parents agree with the students in that college is a great investment in the future and therefore is worth the cost. This distribution is shown below in *Pie Chart-6-9: Distribution of Parents That Think College is Definitely Worth the Cost*.
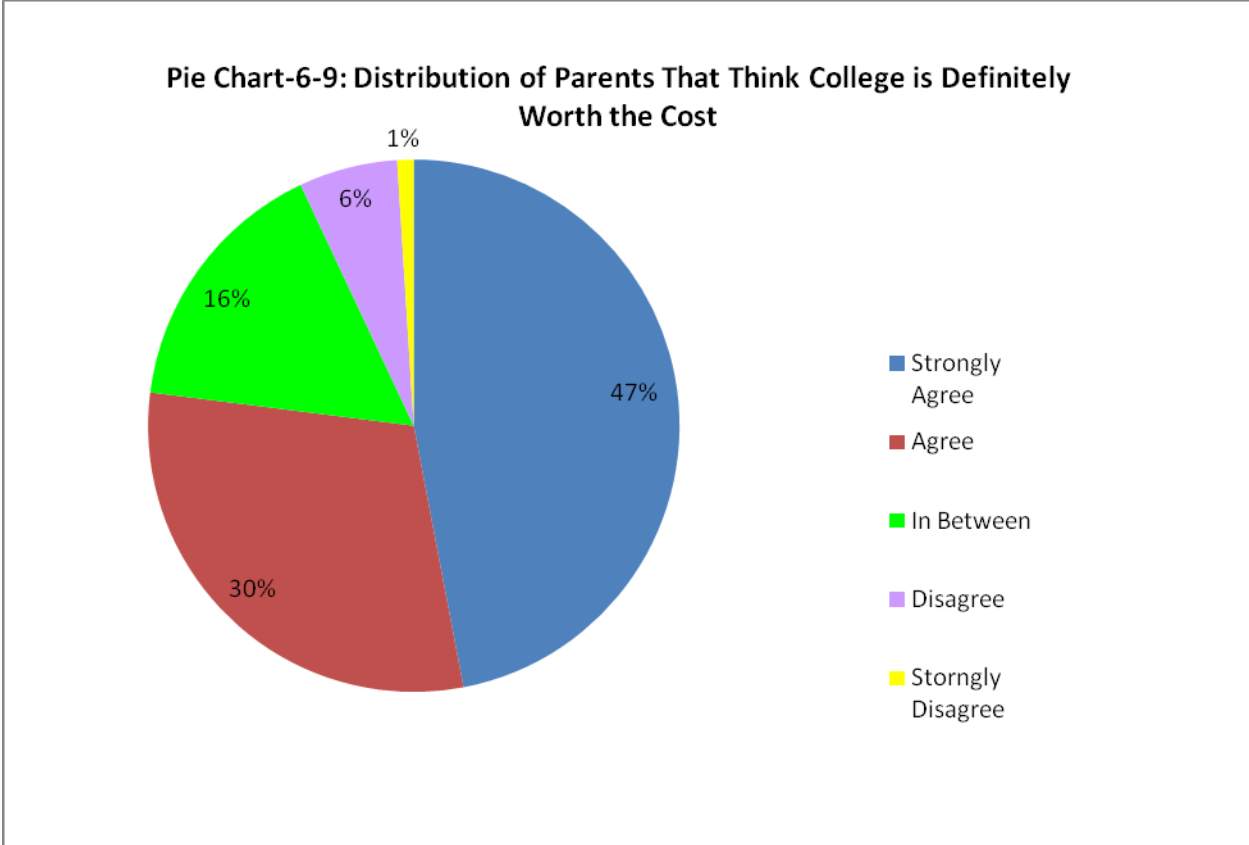
Pie Chart-6-9: Distribution of Parents That Think College is Definitely Worth the Cost

(SallieMae, 2008)

6.2.7 College is Not Affordable for My Family

For the seventh statement, the parents' reactions were as follows:

- Strongly Agree=12%
- Agree=12%
- In Between=13%
- Disagree=20%
- Strongly Disagree=43%

Roughly 25% of the parents surveyed said college was not affordable. This percentage reflects, and is directly related to, the 24% who did not agree college was worth the cost. However, a majority of the parents surveyed, 63%, say that college is affordable by one of the payment methods mentioned earlier in this report. This distribution is shown on the next page in *Pie Chart-6-10: Distribution of Parents That Said College is Not Affordable*.
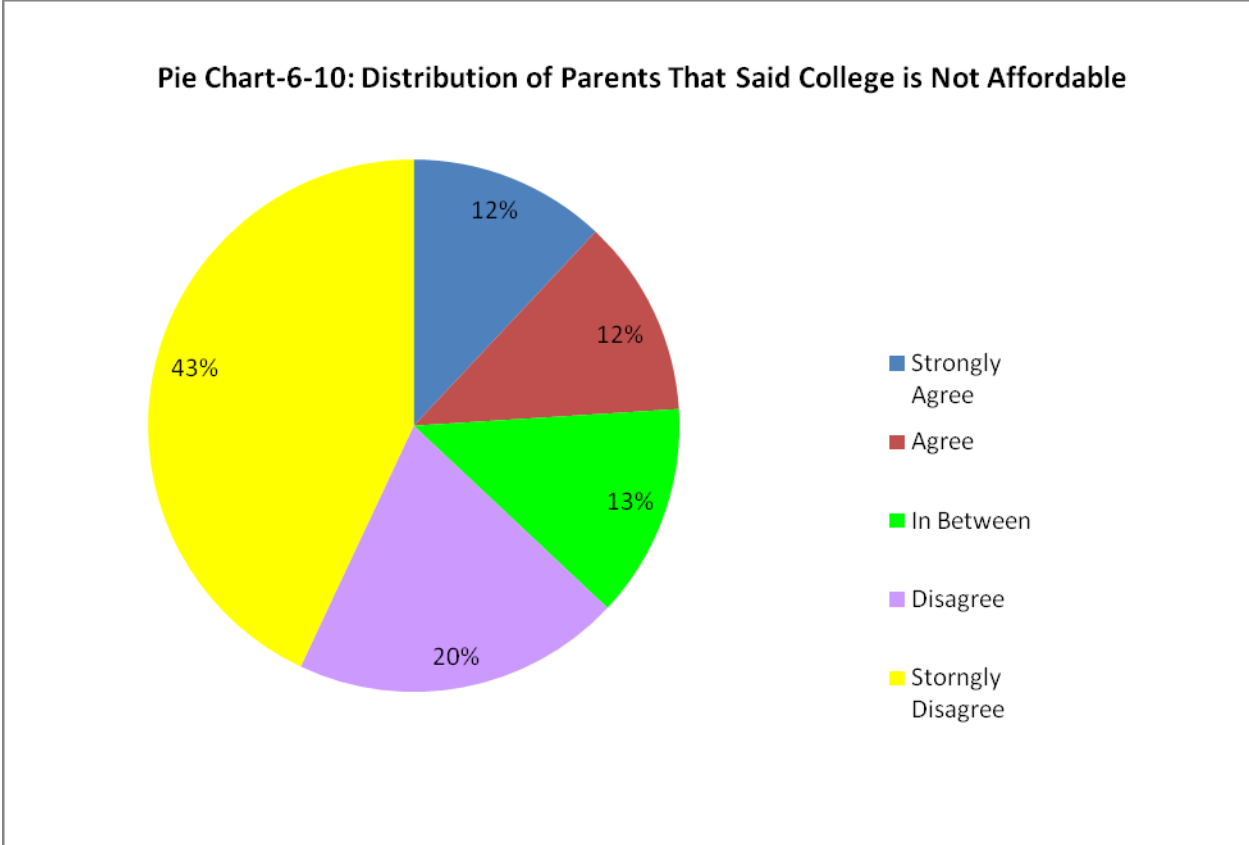
Pie Chart-6-10: Distribution of Parents That Said College is Not Affordable (SallieMae, 2008)

6.2.8 Saving For Retirement is More Important Than Paying For My Child's College Education

For the eighth statement, the parents' reactions were as follows:

- Strongly Agree=12%
- Agree=11%
- In Between=30%
- Disagree=19%
- Strongly Disagree=28%

Looking at the responses concerning about retirement versus paying for college, almost half of these parents feel that paying for college is more important than saving for retirement. For that 47% this shows what kind of investments they are willing to make in their child while deferring their own retirement. Roughly a third, 30%, of these parents were in-between on this question. For this group, paying for college is important, but saving for retirement is also a great priority. For the remaining 23%, saving for retirement is more important than paying for

their child's education. This distribution is shown on the next page in *Pie Chart-6-11: Distribution of Parents That Think Saving for Retirement is More Important Than Paying Their Child's Tuition*.
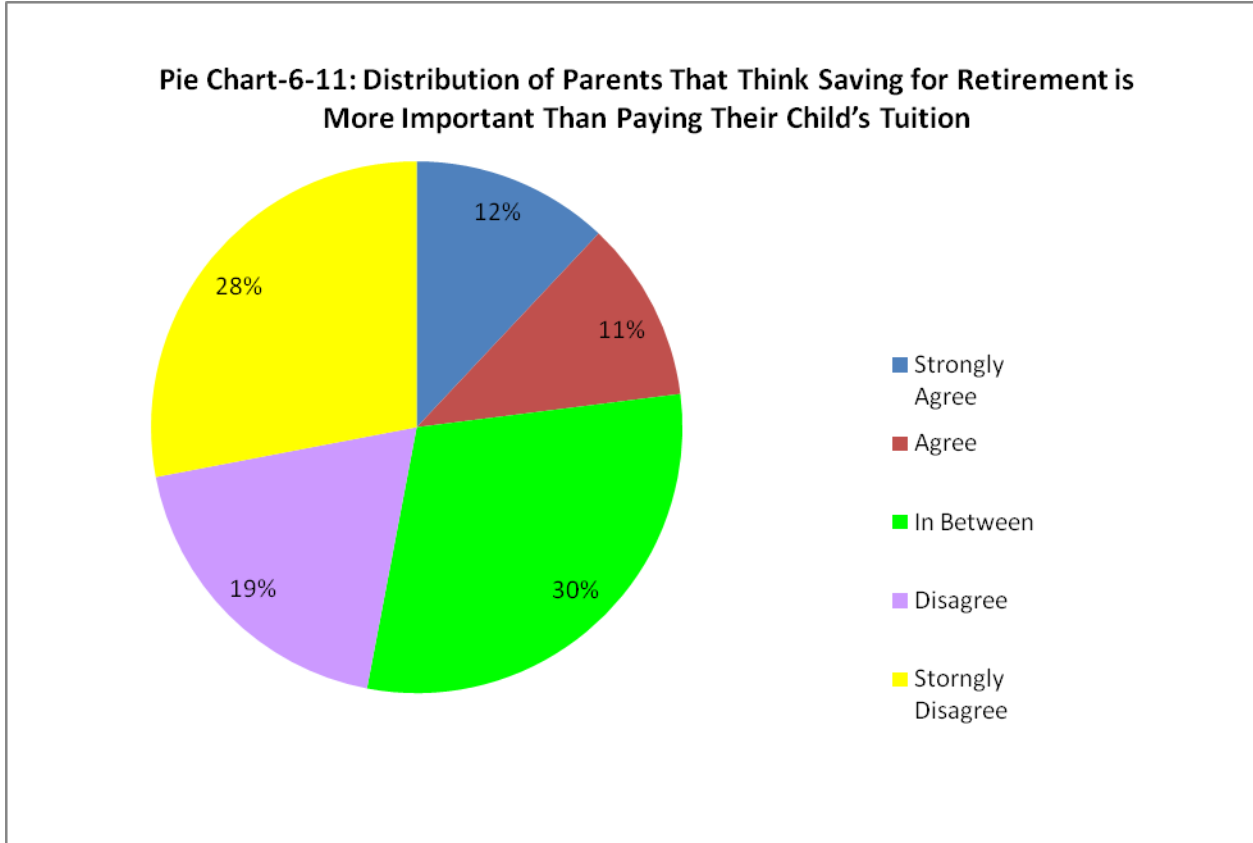
Pie Chart-6-11: Distribution of Parents That Think Saving for Retirement is More Important Than Paying Their Child's Tuition (SallieMae, 2008)

6.2.9 College is An Investment in My Child's Future
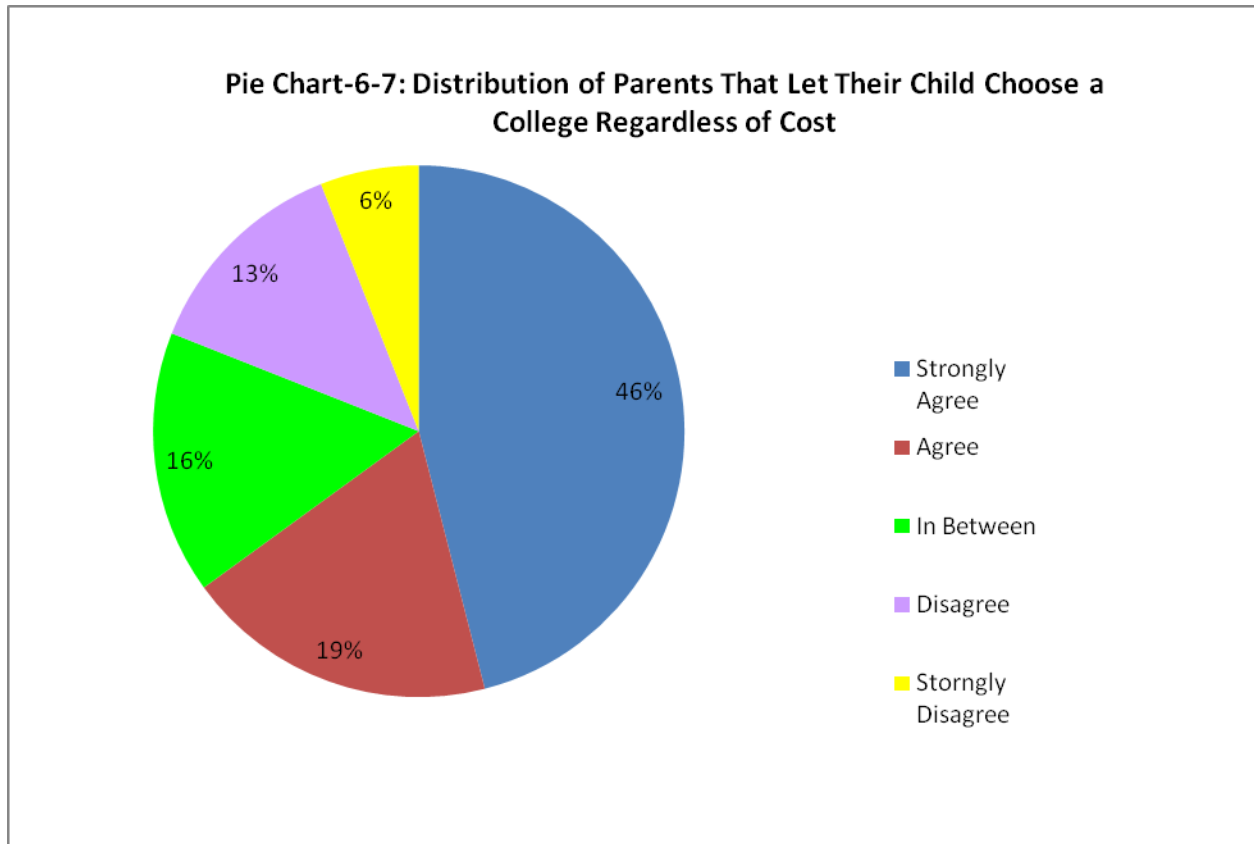
For the ninth statement, the parents' reactions were as follows:
- Strongly Agree=80%
- Agree=14%
- In Between=6%
- Disagree=0%
- Strongly Disagree=0%

This reaction is expected given the percentage of students who agreed with this statement. Specifically, 96% of the students surveyed agree with this statement, and here, 94% of the

parents agree with the statement. This shows most of these parents want their child to go to college, and many are willing to invest in that. As explained before, in most cases once college tuition needs to be paid, that becomes the main financial obligation in the family. This distribution is shown on the next page in *Pie Chart-6-12: Distribution of Parents That Said College is An investment in Their Child's Future*.
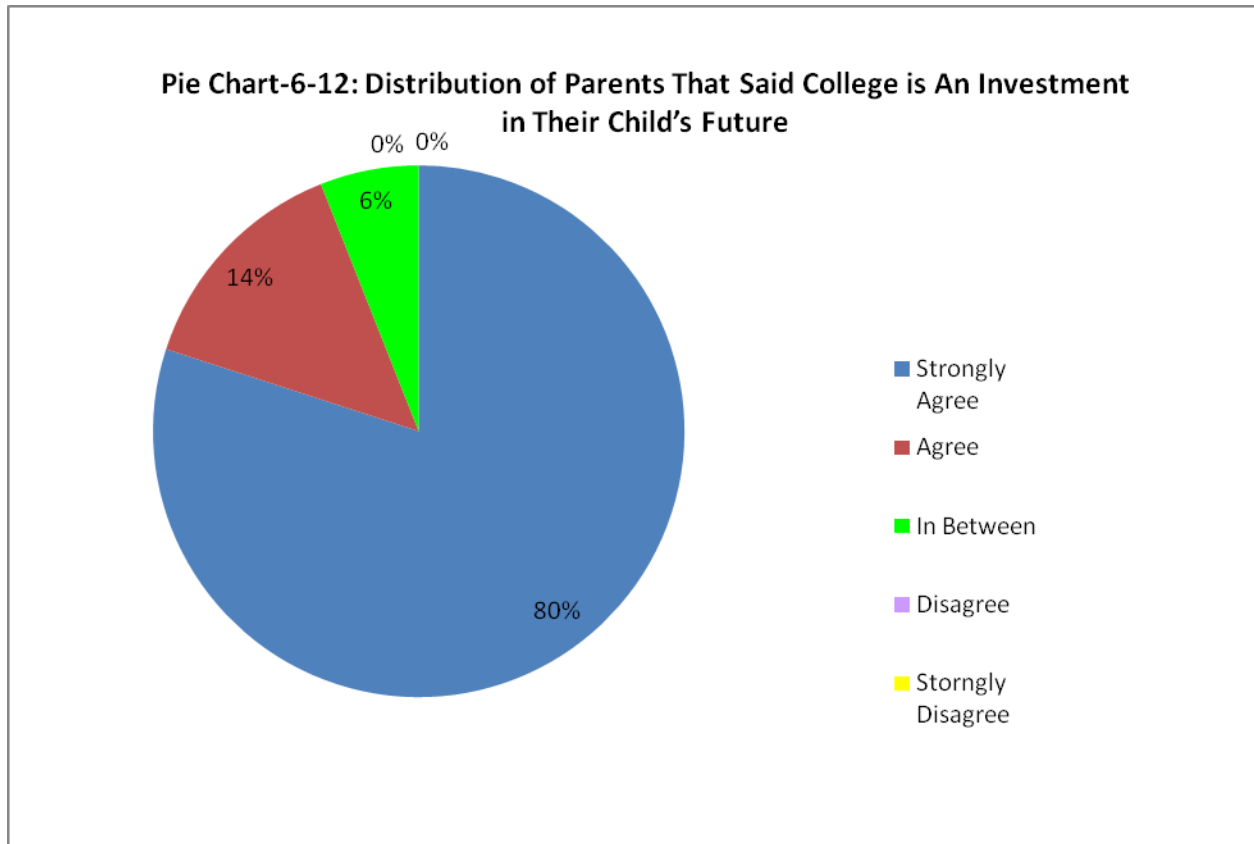
Pie Chart-6-12: Distribution of Parents That Said College is An Investment in Their Child's Future (SallieMae, 2008)

6.2.10 Assisting My Aging Parents Has Reduced the Ability to Pay for My Child's College Education

For the tenth statement the parents' reactions were as follows:
- Strongly Agree=8%
- Agree=4%
- In Between=8%
- Disagree=9%

- Strongly Disagree=71%

For this statement, most of the parents, 80%, responded that assisting their aging parents did not reduce their ability to pay for their child's college education, while a very small portion of the parents surveyed said it did (12%). There are just too many variables here to enable a specific conclusion. Maybe some of this depends on when the student's parents were born and the student's birth order in their family. How successful were the student's grandparents in making good money and keeping good health? Again, there are just too many variables to address here, but for the most part, the parents sampled feel that college tuition hasn't had an effect on their ability to pay for tuition. This distribution is shown below in *Pie Chart-6-13: Distribution of Parents That Said Assisting Their Aging Parents Has Reduced the Ability to Pay for College*.
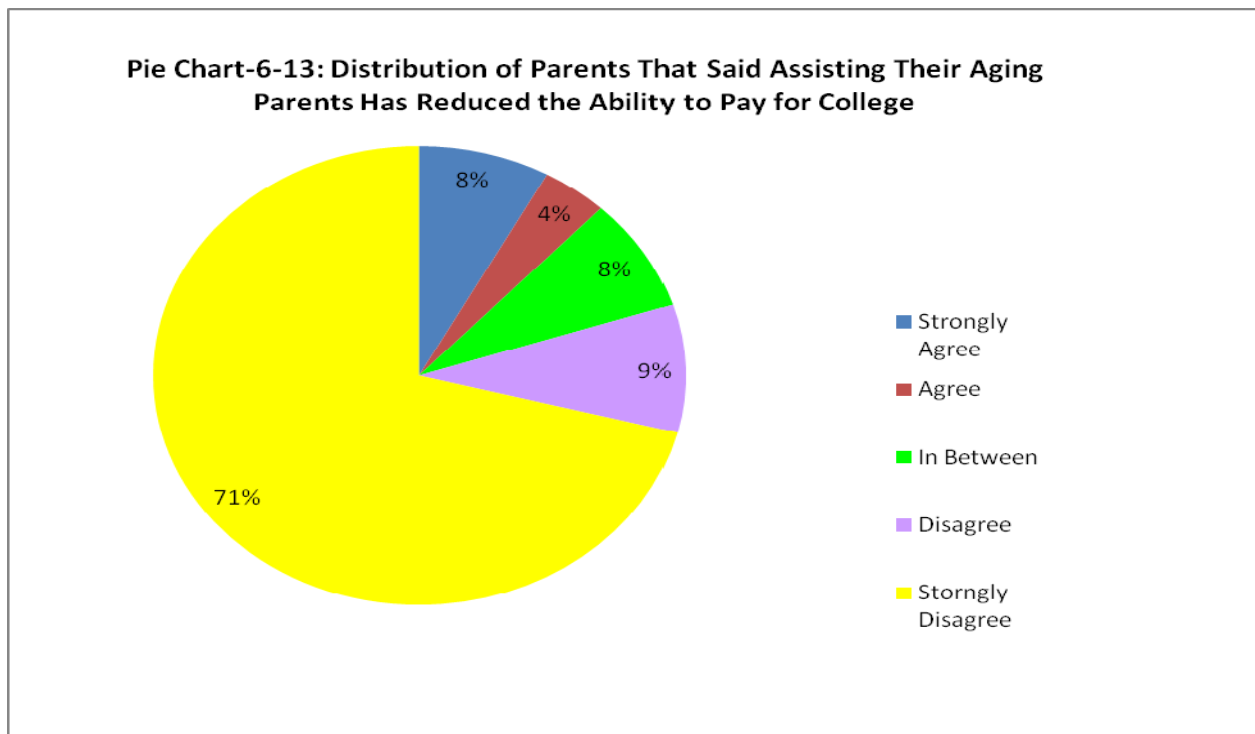
Pie Chart-6-13: Distribution of Parents That Said Assisting Their Aging Parents Has Reduced the Ability to Pay for College (SallieMae, 2008)

7.0 Conclusion

This report assesses how the current students in the KSU COE pay for their education and how they compared to students on a national level. It also addresses the reasons current students came to KSU and information about their personal background.

Given the objective of this report, the information can be used as baseline for future recruiting analyses for the KSU COE. Much of the information reflects how these students pay for their tuition. Therefore, groups and recruiters in the KSU COE that promote the KSU COE now may be more aware of how a majority of the future successful COE students will pay for their education. Having a greater knowledge of what kind of students the KSU COE brings attracts and how they pay for their education could give recruiters better ways to communicate educational opportunities the KSU COE can offer as well as the many different ways students can pay for their education. The distribution of the different payment methods also can show parents the many ways to pay for an undergraduate engineering education at KSU.

The second main topic addressed in this report is the KSU COE's current students. This information given can be used to determine where future students may come from as well as the likely educational background of their families. Also, reasons that these currents students came to KSU are listed. Recruiters can use this information to talk with prospective students about how many students come from each city in Kansas or what areas the out-of-state students tend to come from. The multiple reasons listed by these students for coming to KSU can be used to show potential students how this university is special compared to others. Many prospective students would love to hear about the academic programs, the activities to be involved in, or just know about the general atmosphere of the KSU COE. If nothing else, some of these prospective students follow one of the sports teams and that could draw them in. Finally, the distribution of where students come from and the reasons they come to KSU can be effective recruiting tools when talking to prospective students.

Of the three primary recruiting factors mentioned in the introduction finances, perceptions, and probability of success, finances were the focus for this analysis. In the future, the other two factors can be examined to see what kind of perceptions prospective students have about the KSU CEO and if they feel they can be successful. Also, if a future analysis is performed on the financial factor, a researcher might want to examine how current student demographics affect the ability to pay for a college education. Other factors that could be considered with finances are to analyze how student gender and major have any correlation to how students in the KSU COE pay for their education.

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The Use of Statistics in this Report

The answers from the questionnaire generated data and statistics about this random sample of current students in the COE that could be extrapolated to the overall population of students in the KSU COE. The main reason is the sample size of 89 students was large enough that the population distribution for these students could assume to be normal. (Ott and Longnecker, 2004) This entire report involves a lot of statistical information. Statistics are a measure of a certain variable in a small random sample. These statistics are then used to make conclusions about the general population. In this case, the general population is the student population in the KSU College of Engineering. The variables measured here deal with how the students in the KSU COE pay for their college education and what their background is. Once this information was gathered, the data could be interpreted and results stated.

In particular, normal probability distribution allows general assumptions about the students in the KSU COE to be made. According to *A First Course in Statistical Methods by Ott and Longnecker,* statisticians use the normal probability distribution to establish parameters on a national level such as the height of adult men and women, ACT scores and the weight of newborn babies, among many other variables. Furthermore, the normal probability distribution theory uses a curve as shown in *Figure-A1: Normal Probability Distribution Curve*.

This curve is referred to as the standard probability curve is made with two variables: The first variable is the mean, or the stated average of the specific variable being examined; the second variable is the standard deviation (σ) a value that shows the variability of all collected values for the variable in the data set. The curve is formed starting at the center point, which has the mean value and is drawn out to the left and the right of the mean forming a symmetric bell shape. This curve is the most commonly used probability distribution tool in statistics.

The curve is used to find probability distribution by finding the area under the curve. Referencing *Figure-A1*, the area under the curve is given in percentages of 50%, 68%, 90%, 95%, and 99%. The formulas for finding the area under the curve are shown below:

50% Area= (Mean Value + or - 0.67σ)	*Equation A-1*
68% Area= (Mean Value + or - 1.0σ)	*Equation A-2*
90% Area= (Mean Value + or - 1.64σ)	*Equation A-3*
95% Area= (Mean Value + or -1.96σ)	*Equation A-4*
99% Area= (Mean Value + or -2.58σ)	*Equation A-5*

The formulas represent that if a randomly selected variable is selected, a 99% chance exists that the value of that variable will be in between the resulting values of *Equation A-5*.

For example: someone is studying the weight of green apples. With 99% confidence, what would the expected range for the weight of any selected green apple be?

Mean Value of green apples=3; σ=1
Solution: 99% Area = 3 + or − 2.58 (1) = (0.42, 5.58)
This means, for any selected green apple, a 99% chance exists that the weight of that apple will be in between 0.42 and 5.58 lbs.
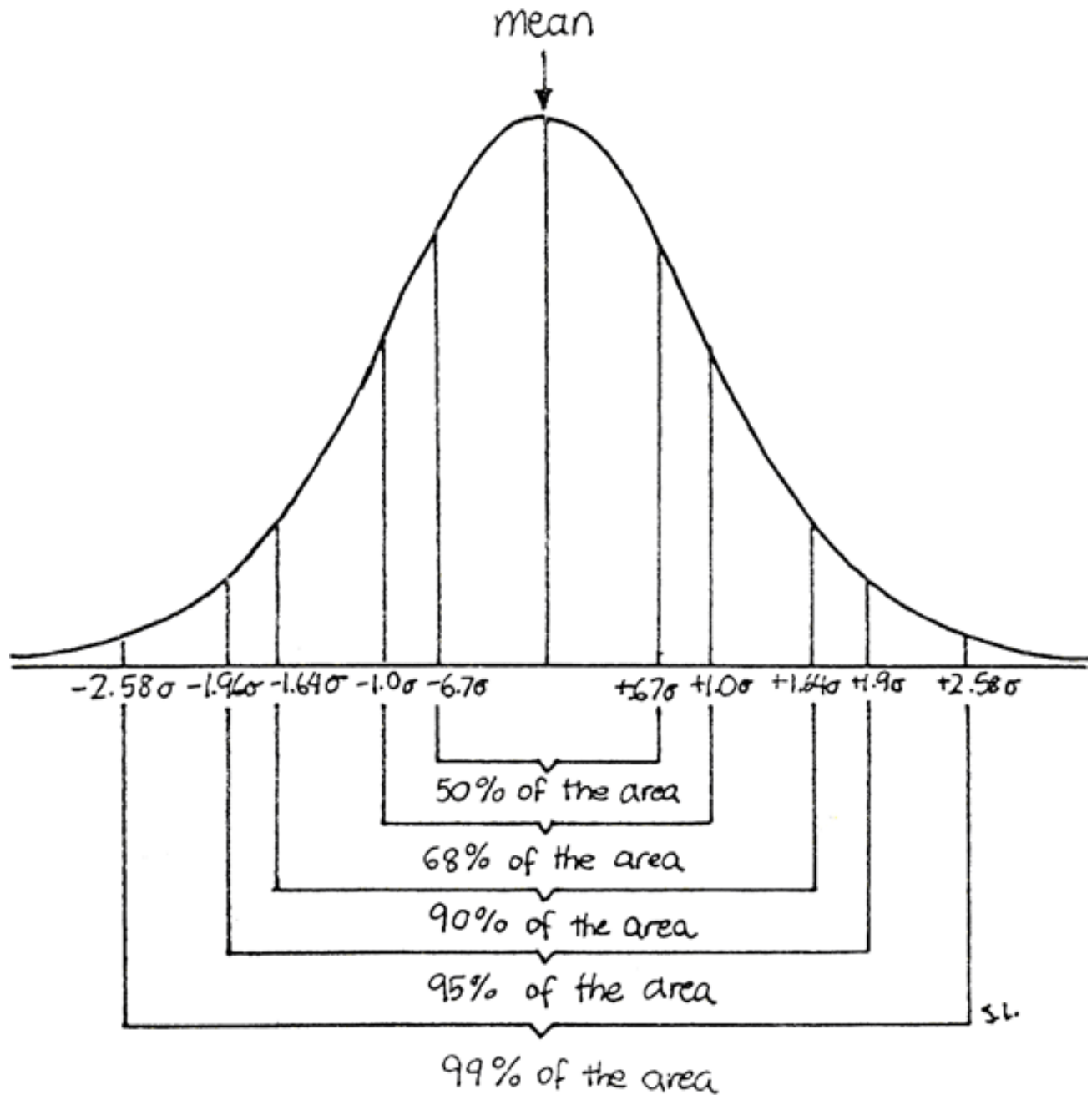
Figure-A1: Normal Probability Distribution Curve (Ott and Longnecker, 2004)

The peak of the probability curve represents the mean, or the average, of the variable being examined. On either side of the curve peak is 50% of the population and how they respond to the variable. A simple example can illustrate the concept of averages. Hypothetically, the average height of a woman in the United States is 5'-5". At random, the height measurements

of 100 women are taken and those who measure 5'-5" are at the national average or mean of women's height such that 50% of the women in this country are shorter than 5'5", and the other half are taller than 5'5", on average.

Sometimes the mean can also be referred to as the 50th percentile. When discussing percentiles, statisticians can say that a certain measurement is greater or less than a certain number in the general population. In this example, if a woman is 5'-5" tall, she is taller than 50% of the women in the U.S. on average.

Standard Deviation is the other concept from the probability curve that is used in this report. Standard Deviation is a number, expressed by the symbol σ in *Figure-A1*, which shows the amount of variance in data collection for the overall population. Standard Deviation is given in *Equation A-6* below.

$$\sigma = (\Sigma(y_{avg}-\mu)/(n-1))^{1/2} \qquad\qquad\qquad\qquad\qquad \textit{Equation A -6}$$

In this equation:
- o y_{avg} is the average measurement of the variable for the small random sample size
- o μ is the average measurement for the variable for the general population
- o "n" is the sample size of the small random sample. For instance, if 20 women were measured for height, the value of "n" is 20.

The smaller standard deviation value means less variance in all the measurements for the same variable. For instance, if the standard deviation is 0.2, very little variance in the data collected occurs. If the standard deviation is 3.20, wide variance in all the data collected occurs. Many times, the standard deviation will be reported as a value of "s" instead of a value of σ. "S" is the standard deviation of the sample size in the experiment or survey. For large sample sizes such sizes when the sample size is greater than 30, it is acceptable to replace σ with s because the probability distribution curve can appear to be normal. (*Ott and Longnecker, 2004)* Thus reported standard deviation values stated are s-values and not σ values.

The standard probability curve also allows confidence intervals to be measured. Confidence intervals state the results of an experiment or survey for a certain variable with a certain amount of confidence. To make a confidence interval for a certain data set, the average value for the variable (y_{avg}) and the standard deviation need to be known (σ). Certain levels of confidence intervals are shown below, which like probability distribution, are based on the area under the normal distribution probability curve.

The formulas for confidence intervals (C.I.) are shown below.

50% C.I.= y_{avg}+or $- 0.67\sigma / (n)^{1/2}$ *Equation A-7*

68% C.I.= y_{avg}+or $- 1.00\sigma / (n)^{1/2}$ *Equation A-8*

90% C.I.= y_{avg}+or $- 1.64\sigma / (n)^{1/2}$ *Equation A-9*

95% C.I.= y_{avg}+or $- 1.96\sigma / (n)^{1/2}$ *Equation A-10*

99% C.I.= y_{avg}+or $- 2.58\sigma / (n)^{1/2}$ *Equation A-11*

For an example of confidence intervals, the women's height example will be referenced: Assume that 35 women were measured for height and that the y_{avg} for the measurements turned out to be 5'6". Assume that standard deviation, σ=2.0. Determine the 99% confidence interval for women's height.

Step 1: Reference Equation A-11

To find the 99% C.I., use the formula listed above y_{avg}+or $- 2.58\sigma / (n)^{1/2}$, and plug in the variables.

Step 2: Substitute Values Into Equation

(Substitute 66" for 5'6" for an easier calculation)

 66" + or $- 2.58(2.0) / (35)^{1/2}$= (65.12", 66.87")

Step 3: State the Results

The results would be stated thus with 99% confidence, on average, women's heights in this country are somewhere between 65.12" and 66.87".

One other statistical theory used in this report is the hypothesis test, sometimes called a significance test. A hypothesis test consists of two statements called the null and alternative hypothesis. The null hypothesis statement is one that a researcher is trying to disprove. The alternative hypothesis is one that a researcher is trying to prove. Once the null and alternative hypotheses are known, tests statistics can be calculated using the equation following.

For a known standard deviation, σ, the test statistic is calculated by

$(y_{avg} - \mu) / (\sigma / n)^{1/2}$ *Equation A -12*

Test statistics are merely calculated numbers that lead investigators to a P-value. Once the test statistic is calculated, its absolute value is used to find the p-value, which is in *Table-A2: Z Tables for Probability Distribution, or Table-A3: Z Tables for Probability Distribution*. These tables are in the Appendix of this report.

The p-value, the chance of observing something more extreme than was observed in the experiment or survey, is compared to an alpha value to see if the null hypothesis can be proven false or not. The alpha value is a number that equals either 0.01, 0.05, or 0.10 to achieve a certain level of testing accuracy to disprove the null hypothesis. The alpha values correspond to 99%, 95%, and 90% accuracy.   For example, if the alpha value is 0.05, the amount of confidence with which the null hypothesis can be rejected is 95%. The alpha value is directly related to the percentage of the confidence interval. Should no confidence interval be shown or α value stated, the α value is always assumed to be 0.05.

The following example problem shows how the hypothesis test works.

Considering the women's height example, 200 random women are measured for height, the average height for all the women in the study (y_{avg}), is 5'-7" (67"). The statistician who performed the experiment claims the national average height of all women to be 5'-7" (67") as a result of the study. To test statistician's claim, we can assume the accepted national average for women's height to be 5'-5" (65"), σ=2.0, and that α=0.05.

Step 1: State the Null and Alternative Hypothesis (H_0, H_A) and α Value

Null Hypothesis: The national average for women's height is 5'7" (67").
Alternative Hypothesis: The national average for women's height is not 5'7" (67").
α=0.05

Step 2: Calculate the Test Statistic

Test Statistic:

$(y_{avg} - \mu) / (\sigma / n)^{1/2}$

Substitute into the equation y_{avg}=65", μ=67", σ=2.0, n=200

(Test Statistic) (67-65)/(2/200)$^{1/2}$ = 20

Step 3: Calculate the Test Statistic

The next step is to check the P-Value. Refer to *Table-A3: Z Tables for Probability Distribution* to find the probability that "Z" is greater than 20.   In the table, for, a "z" value of 5.00, the area under the probability curve is approximately 1.0. Therefore, the probability of having a "z" greater than 5.0 is approximately zero. Therefore, in this example, the "z" value is 20, so the p-value can be assumed to be zero.

Now, before going to the last step, refer back to the hypothesis statements. The alternative hypothesis determines what P-Value needs to be used when the hypothesis test is done. If the test is two sided, or if the alternative hypothesis says the actual value may be higher or lower than what's stated, the P-Value must be doubled. For a one sided test, the alternative hypothesis would say the actual value is only higher than the stated value or only lower than the stated value.

The p-value for in this case needs to be multiplied by two because this hypothesis test is two sided. This test is two sided because the alternative hypothesis states that, "the national average for women's height is not 5'-7" (67")". That statement implies the number could be higher or lower. Had the statement said, "the national average for women's height is less than 5'-7" (67").", that would be considered a one-sided test, and therefore the P-Value would not have to be doubled.

Even when the p-value in this example is doubled, the value is still approximately zero. The next step is to compare the P-value to the α value of 0.5. If the P-value is less than the α value, the null hypothesis can be rejected and the alternative hypothesis can be accepted. Should the P-Value be equal to or greater than the α value, there would be no significant evidence to say the null hypothesis is false. Also in this case, the alternative hypothesis can't be proven true or false because of the lack of evidence. In this case, however, the P-value of zero is a lot less than the α value of 0.05, so the null hypothesis can be rejected. The explanation is in the conclusion below.

Step 4: Communicate Results

Conclude, a statistician would state there is very strong evidence that the national average for women's height is not 5'7" tall (67"). It cannot be certain that the average height is greater than or less than (67") because this test was a two sided hypothesis test.

For the hypothesis test and the confidence intervals to be used, three factors need to be satisfied in accordance with *A First Course in Statistical Methods by Ott and Longnecker*. They are:
- The sample must be taken completely at random
- The distribution for the entire population is normal for the variable being examined. (i.e. the variable being examined takes the shape of the normal probability distribution curve)
- The sample size must be greater than or equal to 50.

Relating those factors to this report's data, all the requirements are met to use the hypothesis test and the confidence intervals: The sample of students was taken at random; All students surveyed were 4th or 5th year students in the COE; The student sample size of 89 was greater than 50. Concerning the variables being examined, the distribution can be assumed normal.

One final statistical theory used in this report is a dependence test, which determines whether two variables are related or not. In this report, a dependence test is used to show if being a college student in the KSU COE and having a college educated parent are independent.

The dependence test uses the principles of independent and dependent variables. As stated, dependence tests involve measuring two variables. The first variable, or independent variable, is the one the person running the survey or experiment has control over and can manipulate. The second variable is considered "dependent" if its resulting measurements are affected by the independent variable. If the second variable's measurements are not affected by the independent variable, the second variable is considered, "independent".

Chi-squared tests are used in statistics to test for independence according to *A First Course in Statistical Methods by Ott and Longnecker.* To see an example of a dependence test, an example problem later compares men's exercise level to marital status to see if they are independent after the theory seen below.

Dependence tests are set up in tables with multiple rows and columns. Checking the variables for dependence involves calculating an expected frequency of an event from each row and column. The paradigm for a dependence problem is explained below.

The first step in solving a dependence problem is to write out the null and alternative hypotheses and α value. The second step is to calculate the expected frequency of each event for every row and column. The expected frequency is the expected value in the event if the two variables being examined are independent. Expected frequencies are denoted by E_{ij} and are read the expected frequency of event "E" with condition "i" and "j". Condition "i" and Condition "j" mean the number in row "i" and the number in column "j".   The equation below shows how to calculate expected frequencies:

$E_{ij} = (n_i \text{ x } n_j)/n$ *Equation A-13*

For this equation,

E_{ij} = Expected frequency
n_i =number in row for condition "i"
n_j =number in column for condition "j"
n = total number in the sample

Once all the expected frequencies are calculated, they need to be summed and the total value of expected frequencies is the X^2 value. After the X^2 value is calculated, the degrees of freedom need to found, a calculated value used to find the appropriate P-Value in the X^2 table. In this report, that is *Tables-A4, A5: X^2 Tables for Probability Distribution*.   A degree of freedom takes into account the differences in sample sizes to use the correct distribution on the X^2 table. In the case of a dependence test, the degrees of freedom take into account the differences in the sample sizes of the rows and columns, which might not have a normal distribution as shown in Figure-1. The degrees of freedom take into account the differences in sample sizes so one X^2 table can be used to find the P-Value. For a dependence test, the degrees of freedom are calculated by

DF= (r-1)(c-1*)* *Equation A-14*

Where,

r=number of rows

c=number of columns

Below is *Table A1: Exercise Level Versus Marital Status* that hypothetically shows the number of men and their exercise level based on their marital status.

Once the degrees of freedom are known, the P-Value comes from either table A4 or A5. As with the hypothesis test, once the P-Value is known, it is compared to the alpha value to see if the null hypothesis can be rejected. Again, should the alpha value be greater than the P-Value, the null hypothesis can be rejected and the alternative accepted. Should the P-Value be equal to or greater than the alpha value, the null hypothesis can't be rejected.

Marital Status	Exercise Level			Total
	Little	Moderate	Heavy	
Married	19	14	3	36
Single	22	33	14	69
Widowed/Divorced	16	29	9	54
Total	57	76	26	159

Table A1: Exercise Level Versus Marital Status

So, are exercise level and marital status for men independent?

Step 1: State the Null and Alternative Hypothesis (H_0, H_A) and α Value

Null Hypothesis (H_0): Marital Status and Exercise Level for Men are Independent

Alternative Hypothesis (H_A): Marital Status and Exercise Level for Men are Dependent

α Value is assumed to be 0.5

Step 2: Calculate the Expected Frequencies

Column Identification (Little=1; Moderate=2; Heavy=3)
Row Identification (Married=1; Moderate=2; Heavy=3)

Expected Frequencies:

E_{11} = (36*57)/159=12.9

E_{21} = (69*57)/159=24.7
E_{31} = (69*57)/159=19.4
E_{12} = (36*76)/159=17.2
E_{22} = (69*76)/159=33.0
E_{32}= (54*76)/159=25.8
E_{13} = (36*26)/159=5.9
E_{23} = (69*26)/159=11.3
E_{33}= (54*26)/159=8.8

Step 3: Sum the Expected Frequencies to get X^2 Value

X^2= 12.9+24.7+19.4+17.2+33.0+25.8+5.9+11.3+8.8=159.0

Step 4: Find Degrees of Freedom

DF= (r-1)(c-1)=(3-1)(3-1)=4

r=3
c=3

Step 5: Go to Table-A4,5 and Find P-Value

For 4 degrees of freedom, the P-value is going to be extremely small since 159 does not even show up on the table for the column of 0.001. This P-value being extremely small means it is less than the α value of 0.05, so the null hypothesis, H_0, can be rejected.

Step 6: State Results

Therefore, as dependence test result shows, there is extremely strong evidence that marital status and men's exercise level are dependent on average.

The statistics theory in this section was used to how current students in the KSU COE pay for their education to the students in the national report, "How America Pays for College." However, first, the next section is a detailed description of how students pay for college on the national scope.
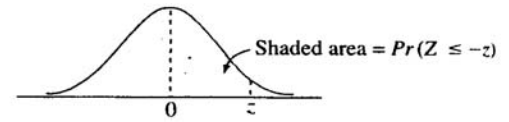
TABLE 1
Standard normal curve areas

Shaded area = $Pr(Z \leq -z)$

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
−3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
−3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
−3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
−3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
−3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
−2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
−2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
−2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
−2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
−2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
−2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
−2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
−2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
−2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
−2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
−1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
−1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
−1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
−1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
−1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
−1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
−1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
−1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
−1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
−1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
−0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
−0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
−0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
−0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
−0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
−0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
−0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
−0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
−0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
−0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

z	Area
−3.50	0.00023263
−4.00	0.00003167
−4.50	0.00000340
−5.00	0.00000029

Table-A2: Z Tables for Probability Distribution (Ott and Longnecker, 2004)

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z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

z	Area
3.50	0.99976737
4.00	0.99996833
4.50	0.99999660
5.00	0.99999971

Table-A3: Z Tables for Probability Distribution (Ott and Longnecker, 2004)
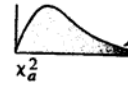
TABLE 8						
Percentage points of the chi-square distribution	df/a =	.999	.995	.99	.975	.95	.9

TABLE 8
Percentage points of the chi-square distribution

df/a =	.999	.995	.99	.975	.95	.9
1	.000002	.000039	.000157	.000982	.003932	.01
2	.002001	.01003	.02010	.05064	.1026	.21(
3	.02430	.07172	.1148	.2158	.3518	.58
4	.09080	.2070	.2971	.4844	.7107	1.06
5	.2102	.4117	.5543	.8312	1.145	1.61(
6	.3811	.6757	.8721	1.237	1.635	2.20
7	.5985	.9893	1.239	1.690	2.167	2.83
8	.8571	1.344	1.646	2.180	2.733	3.49(
9	1.152	1.735	2.088	2.700	3.325	4.168
10	1.479	2.156	2.558	3.247	3.940	4.865
11	1.834	2.603	3.053	3.816	4.575	5.578
12	2.214	3.074	3.571	4.404	5.226	6.304
13	2.617	3.565	4.107	5.009	5.892	7.04
14	3.041	4.075	4.660	5.629	6.571	7.79(
15	3.483	4.601	5.229	6.262	7.261	8.54
16	3.942	5.142	5.812	6.908	7.962	9.312
17	4.416	5.697	6.408	7.564	8.672	10.09
18	4.905	6.265	7.015	8.231	9.390	10.86
19	5.407	6.844	7.633	8.907	10.12	11.65
20	5.921	7.434	8.260	9.591	10.85	12.44
21	6.447	8.034	8.897	10.28	11.59	13.24
22	6.983	8.643	9.542	10.98	12.34	14.04
23	7.529	9.260	10.20	11.69	13.09	14.85
24	8.085	9.886	10.86	12.40	13.85	15.66
25	8.649	10.52	11.52	13.12	14.61	16.47
26	9.222	11.16	12.20	13.84	15.38	17.29
27	9.803	11.81	12.88	14.57	16.15	18.11
28	10.39	12.46	13.56	15.31	16.93	18.94
29	10.99	13.12	14.26	16.06	17.71	19.77
30	11.59	13.79	14.95	16.79	18.49	20.60
40	17.92	20.71	22.16	24.43	26.51	29.05
50	24.67	27.99	29.71	32.36	34.76	37.69
60	31.74	35.53	37.48	40.48	43.19	46.46
70	39.04	43.28	45.44	48.76	51.74	55.33
80	46.52	51.17	53.54	57.15	60.39	64.28
90	54.16	59.20	61.75	65.65	69.13	73.29
100	61.92	67.33	70.06	74.22	77.93	82.36
120	77.76	83.85	86.92	91.57	95.70	100.62
240	177.95	187.32	191.99	198.98	205.14	212.39

Table-A4: X^2 Tables for Probability Distribution (Ott and Longnecker, 2004)

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TABLE 8 (continued)	$a = .10$	.05	.025	.01	.005	.001	df
	2.706	3.841	5.024	6.635	7.879	10.83	1
	4.605	5.991	7.378	9.210	10.60	13.82	2
	6.251	7.815	9.348	11.34	12.84	16.27	3
	7.779	9.488	11.14	13.28	14.86	18.47	4
	9.236	11.07	12.83	15.09	16.75	20.52	5
	10.64	12.59	14.45	16.81	18.55	22.46	6
	12.02	14.07	16.01	18.48	20.28	24.32	7
	13.36	15.51	17.53	20.09	21.95	26.12	8
	14.68	16.92	19.02	21.67	23.59	27.88	9
	15.99	18.31	20.48	23.21	25.19	29.59	10
	17.28	19.68	21.92	24.72	26.76	31.27	11
	18.55	21.03	23.34	26.22	28.30	32.91	12
	19.81	22.36	24.74	27.69	29.82	34.53	13
	21.06	23.68	26.12	29.14	31.32	36.12	14
	22.31	25.00	27.49	30.58	32.80	37.70	15
	23.54	26.30	28.85	32.00	34.27	39.25	16
	24.77	27.59	30.19	33.41	35.72	40.79	17
	25.99	28.87	31.53	34.81	37.16	42.31	18
	27.20	30.14	32.85	36.19	38.58	43.82	19
	28.41	31.41	34.17	37.57	40.00	45.31	20
	29.62	32.67	35.48	38.93	41.40	46.80	21
	30.81	33.92	36.78	40.29	42.80	48.27	22
	32.01	35.17	38.08	41.64	44.18	49.73	23
	33.20	36.42	39.36	42.98	45.56	51.18	24
	34.38	37.65	40.65	44.31	46.93	52.62	25
	35.56	38.89	41.92	45.64	48.29	54.05	26
	36.74	40.11	43.19	46.96	49.65	55.48	27
	37.92	41.34	44.46	48.28	50.99	56.89	28
	39.09	42.56	45.72	49.59	52.34	58.30	29
	40.26	43.77	46.98	50.89	53.67	59.70	30
	51.81	55.76	59.34	63.69	66.77	73.40	40
	63.17	67.50	71.42	76.15	79.49	86.66	50
	74.40	79.08	83.30	88.38	91.95	99.61	60
	85.53	90.53	95.02	100.43	104.21	112.32	70
	96.58	101.88	106.63	112.33	116.32	124.84	80
	107.57	113.15	118.14	124.12	128.30	137.21	90
	118.50	124.34	129.56	135.81	140.17	149.45	100
	140.23	146.57	152.21	158.95	163.65	173.62	120
	268.47	277.14	284.80	293.89	300.18	313.44	240

Source: Computed by P. J. Hildebrand.

Table-A5: X^2 Tables for Probability Distribution (Ott and Longnecker, 2004)

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Appendix B

A Recruiting Analysis for the Kansas State College of Engineering Questionnaire

1. Are you solely paying for your college tuition?

2. Are your parents solely paying for your college tuition?

3. Are you and your parents dividing the costs of you college tuition?

4. Are you using any type of loans/grants?

5. Were you offered any scholarships to come to K-State?

    a. If yes, please specify which.

    b. Are any of the scholarships from the College of Engineering?

6. If you answered no to questions 1, 2, and 3, and do not have any scholarships or student loans, how is your tuition being paid for?

7. When you were exploring colleges, did you find studying engineering at Kansas State to be more affordable than at other universities?

    a. If yes, please indicate which other colleges you explored.

    b. If Kansas State was more affordable, was that the main reason for coming?

8. Are you the first person in your family to go to college?

    a. If no, who in your family has gone to college and received a degree?

9. Were the academic programs offered by the College of Engineering the main reason you came to K-State?

    a. If no, what was the biggest reason?

10. Did you transfer to Kansas State from a community college?

    a. If yes, what community college was it?

11. If you attended community college, why did you start there?

12. What high school did you attend and where is it located?