

Appendix D - UNIVERSITY HONORS PROGRAM
SENIOR PROJECT - APPROVAL

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College: Engineering Department: Chemical

Faculty Mentor: Dr. Charles F. Moore

PROJECT TITLE: A Characteristic Study to
Determine the Necessary Attributes for a
Chemical Engineering Student

I have reviewed this completed senior honors thesis with this student and certify that it is a project commensurate with honors level undergraduate research in this field.

Signed: Charles F. Moore Faculty Mentor

Date: 7/24/98

Comments (Optional):

I think Brandy did an excellent job on her survey. ~~and~~ The survey and her analysis are timely. We are in the process of reviewing our undergraduate curriculum. ~~The~~ The ~~an~~ accreditation process for engineering now requires feedback from our various constituents. Brandy's use of the web to ~~conduct~~ conduct this survey will be a useful model for ~~the~~ the ongoing process of feedback.

Thanks²⁷

University Honors 458
Senior Project
University of Tennessee, Knoxville
Spring Semester, 1998

A Characteristic Study to Determine the Necessary Attributes for a Chemical Engineering Student

Brandy N. Miller
Whittle Scholar

Dr. Charles F. Moore, faculty mentor
Nick van Goor, web assistant

Acknowledgments

The principal advisor for this project and report was Dr. Charles F. Moore, department head of the chemical engineering department at the University of Tennessee. He also served as the faculty mentor. Nick van Goor, a PhD candidate in chemical engineering was also an advisor for the web-based survey that was conducted. In-class guidance was provided by Dr. Tom Broadhead, director of the Honors Program at the University of Tennessee and Michelle Blackwell, assistant director of the Honors Program at UT. Dr. Peter Cummings and Dr. Paul Frymier, chemical engineering professors at the University of Tennessee, provided the connection for the web-based survey to the chemical engineering home page. Support was also provided by the many undergraduates, graduates, faculty, alumni, and recruiters that responded to the survey.

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Summary

The purpose of this study was to determine what five different, but related, groups of people deem as the appropriate skills, qualities, and activities for a chemical engineering student. This information was determined by conducting a confidential, web-based survey in which the different classifications could rank order a list of qualities and skills and a list of activities. This data was then collected and some comparisons and contrasts were made.

There were only five qualities and skills that all five classifications ranked as very important. However, there was an additional three that all of the groups immediately related to the University of Tennessee chose as very important. As for the make-up of the respondents, the majority of the group were undergraduate students, followed by graduate students, followed by alumni. These larger pools and the smaller pools of faculty and recruiters could have been attributed to a number of things. Where the list of activities was concerned, all of the classifications repeatedly ranked the majority of them as not important.

All of the information that was found can be used to help the chemical engineering department focus on what skills and qualities the students are lacking in. The department will also be able to reiterate what the students are already learning. The data showed some surprising developments as well. It was hypothesized at first, that recruiters would rank certain skills and qualities higher than students or professors would. However, most of the time, this was not the case. All classifications gave similar rankings for all, but a few of the questions.

It was found that it seemed as a person grew older and was involved in University life at higher levels that their view of certain qualities and skills reflected this maturation. It appeared that as a person progressed from undergraduate to graduate to alumni to faculty status that their views changed. Even most recruiters who are not directly associated with the University held views similar to the upper levels of association. All in all, the study concluded that people associated with the chemical engineering field still do not find certain attributes and skills necessary to be an “ideal” chemical engineering student. It was found that what a person would expect to be important to these people was deemed important, while what was expected to be less or not important was as well.

Chapter 1: Introduction

For an adult to be productive in the work place and in the community, they must possess certain skills and qualities that help them to provide for themselves, their families, their employers, etc. The same is true for students. In order for a student to be successful in college and make it through their classes, interviews, extracurricular activities, etc. they must also possess certain attributes that help them to provide for their own needs.

The purpose of this project is to determine what five different, but related, groups of people feel are the necessary skills, qualities, and activities that the “ideal” chemical engineering student should possess or be involved in. All of these groups are related to the University of Tennessee in some fashion. They range from undergraduates who are currently enrolled in the chemical engineering program to recruiters who are scouting campuses to fill job positions.

This project is designed to be a web-based survey that is totally confidential. Responses from undergraduates, graduates, and alumni will be solicited through email distribution lists. However, responding to the survey is done on a voluntary basis. The survey is to be accessible for three months through the chemical engineering home page. The survey consists of several types of questions. There are a few demographic questions that are to be used to determine the amount of respondents for each category, as well as, some specific questions that apply to students. The bulk of the survey, however, consists of a list of 42 skills and qualities and a list of 12 activities that the respondents will rank order from a scale of 1 (Not important) to 5 (Very important). A copy of this survey in its entirety can be found in the Appendix.

The information that is obtained from this study will be used by the chemical engineering department in their upcoming ABET 2000 accreditation assessment. The department will then be able to focus on what improvements and changes need to be made. The department will also be able to determine what qualities and skills the students already possess.

The principal advisor for this project is Dr. Charles F. Moore of the University of Tennessee. Nick van Goor, a PhD candidate at the University, is providing assistance with the web-based survey. In addition, Dr. Peter Cummings, Dr. Paul Frymier, Dr. Tom Broadhead, and Michelle Blackwell, all of the University of Tennessee, are giving support through computer help and classroom guidance.

The scope of this manuscript includes a study of the possible skills, qualities, and attributes and how each of the five groups relates them to today's chemical engineering students. All of the data collected for each of the five groups will be shown, as well as, some comparisons and contrasts between the different groups.

Chapter 2: Background

Whittle Scholars at The University of Tennessee are required to design and complete an original project in order to graduate. The projects are monitored through a faculty mentor and a classroom setting. The faculty mentor is chosen based on the student's preference, availability of professors, project definition, and compatibility to the student's interest. The student is monitored in the classroom setting through the Honors Program. Most students elect to take this class the semester of graduation. Most students also elect to choose a project that applies in some way to their field of study during their college years.

This project was chosen based on the idea that chemical engineering students need to possess a number of different qualities and skills in order to make them successful students and adults. In this day and age, it seems that certain majors are biased towards certain attributes and activities. For example, it can be assumed that speech communication majors have good communication skills while international studies majors have cultural knowledge and sports management majors are involved in team sports. In this same sense, it can also be assumed that students that major in science-related fields may lack some of the attributes that would make them "well-rounded" or "ideal." However, these assumptions are not always the case.

The final form of this project was devised from a number of other ideas merged into one. Originally, it was going to weigh the effects of extracurricular activities on a student's grade point average (GPA) and vice versa. One goal was to determine whether or not the amount of activities that a student was involved in and the amount of weekly hours spent on them affected their GPA. Another goal was to determine whether a

student would increase the amount of hours they spent on activities outside the classroom if they knew their grades would drop and vice versa. In some student's cases they are able to be involved in a wide range of activities and still perform very well in school, while at the same time other students aren't able to excel at both. Another idea that led to the final project was the fact that students and faculty, etc. regard different attributes as important to a student's education. This fact is perhaps one of the reasons that a student will focus on different goals during their college years than perhaps their professors would like for them to. This in turn could be the cause of many students' inability to perform well in interviews and in the workplace. A third idea that evoked the final project was the fact that the chemical engineering department at the University provides students with the opportunity to learn such skills and qualities as teamwork, cooperation, time management skills, dependability, and resourcefulness. However, along this same concept, such things as social skills, poise, leadership, tolerance, and flexibility are not always stressed in science-related fields. After taking all of these ideas and determining how they relate to each other, a combination of all of them was decided upon for the final project.

Chapter 3: Results and Conclusions

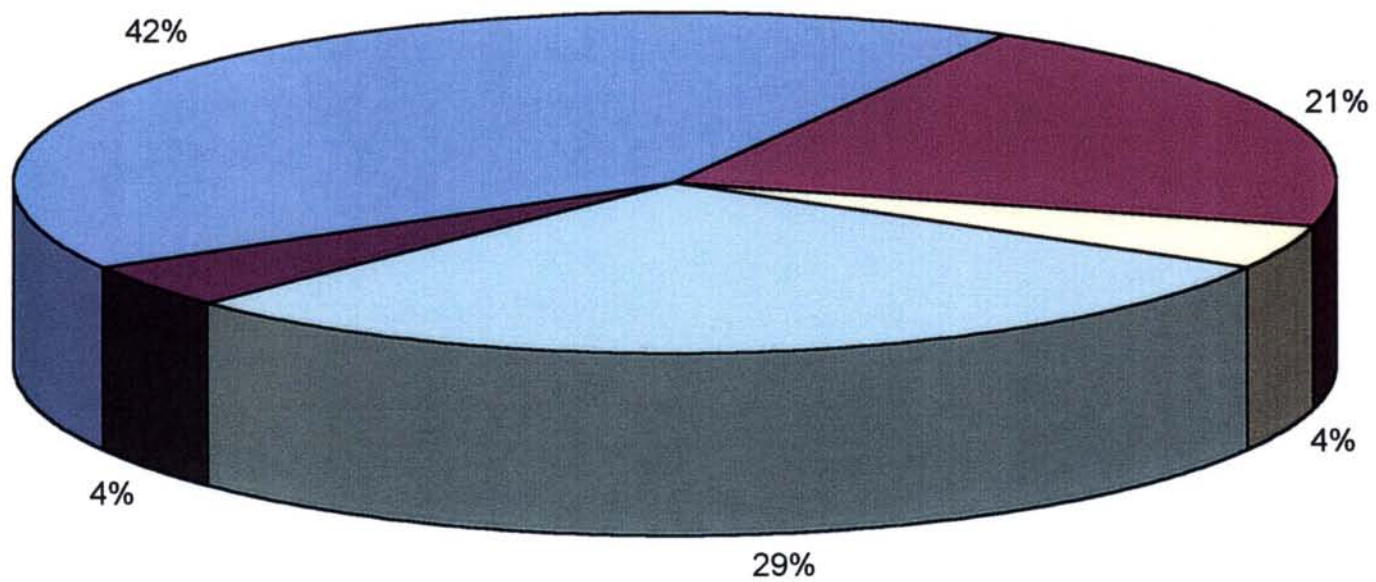
The data collected from this project has allowed comparisons and contrasts to be made between what five different groups of people deem as the most important attributes an “ideal” chemical engineering student should possess. However, as with any survey the data has had many opportunities to be become skewed. There were many assumptions made in the beginning of this project towards each of the five groups and what their answers might be. After the data was collected and tabulated it was found that some of these held true, while others were totally opposite of the assumptions.

When the web-based survey was first made it was assumed that the majority of the respondents would be undergraduate students. This turned out to be correct. This is assumed to be true because of all of the samples surveyed the undergraduate pool is the largest. There is a limited number of faculty, graduate students and recruiters, therefore, their pools were smaller. It is felt that the undergraduates, graduates, and alumni had larger pools than faculty and recruiters because they were solicited to respond through mass emails. The amount of respondents for each classification and the percentage for the total survey are showed in Table 1 and graphically in Figure 1.

Table 1: Survey Samples and the Amount of Respondents

Survey Samples		
Classification	# of Respondents	% of Total Survey
Undergraduates	50	42%
Graduates	25	21%
Faculty	5	4%
Alumni	35	29%
Recruiters	5	4%

Figure 1: % of Total Respondents for Each Survey Classification



Undergraduates Graduates Faculty Alumni Recruiters

Undergraduates and graduates were asked three other demographic questions. These pertained to GPA, the amount of hours spent weekly on extracurricular activities, and whether they were a chemical engineering major or not. The GPA question was asked for a few reasons. First, to understand what type of people were responding to the survey. It can be assumed that “smarter” students would want to help in this type of project, as well as, have the common sense to understand the words and the meaning of the project. Second, to determine if students who participated more in extracurricular activities ranked certain attributes higher than others. Third, to ensure that the students who were responding to the survey were chemical engineering students. This is because the project is trying to determine what an “ideal” chemical engineering student is. Therefore, there doesn’t need to be any accounting majors providing their opinions. The GPA ranges for the students are shown in Figure 2 for undergraduates and Figure 3 for graduates. The tables with the amount of respondents for each range are shown in the Appendix. The data collected for the amount of hours spent weekly by undergraduates and graduates on extracurricular activities are also shown in Figures 4 and 5, respectively.

Figure 2: Undergraduate Students' GPA Ranges

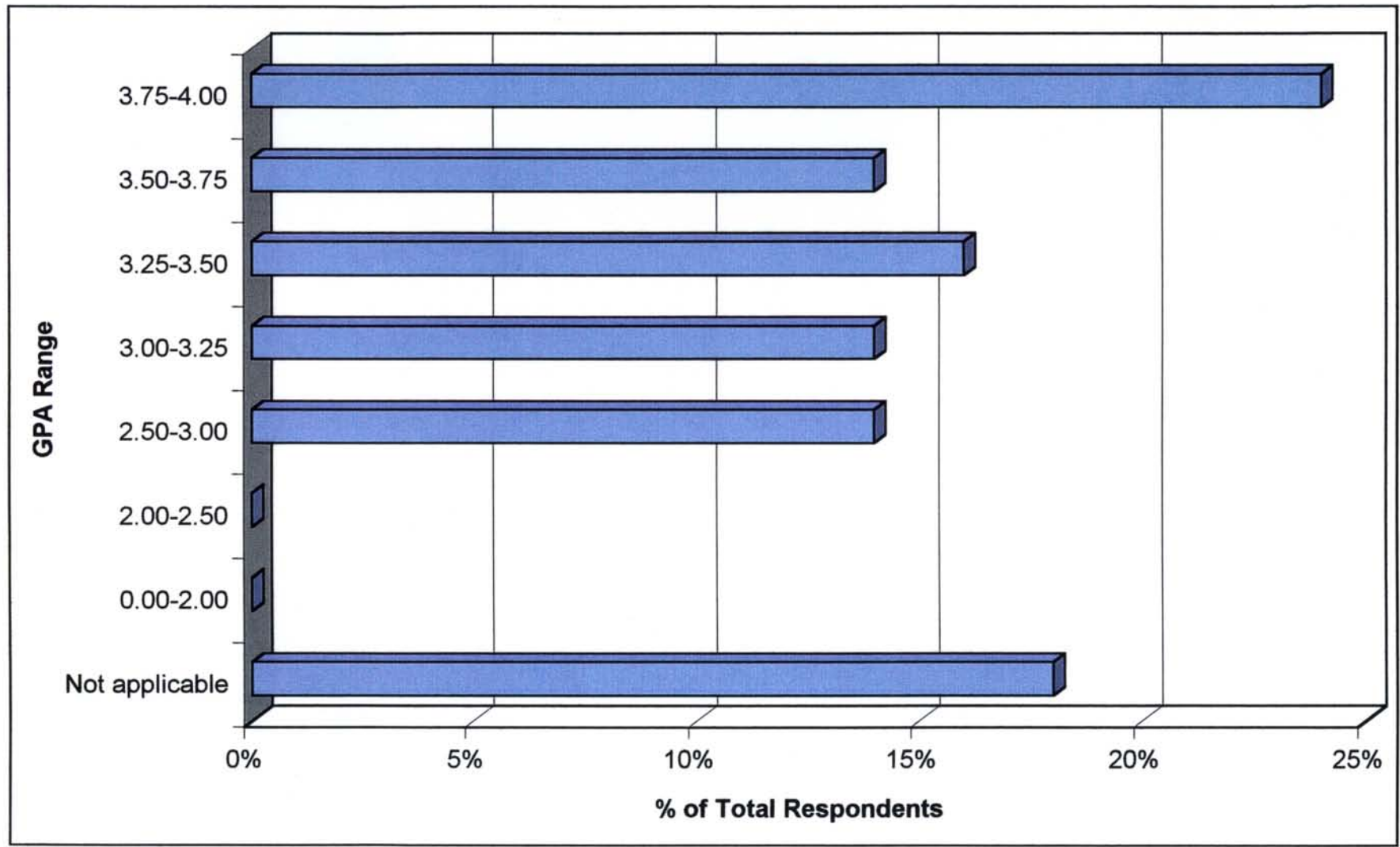
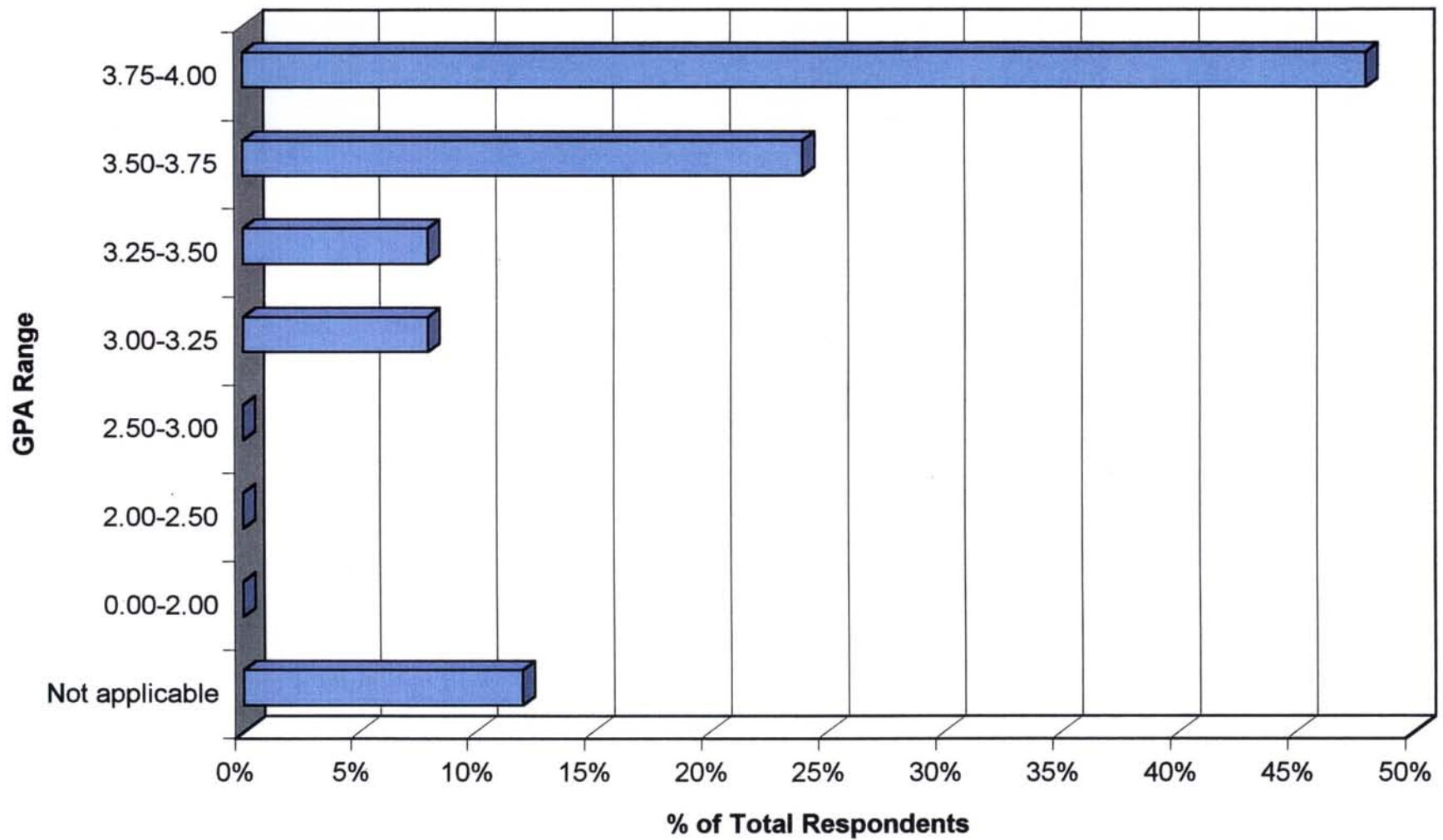
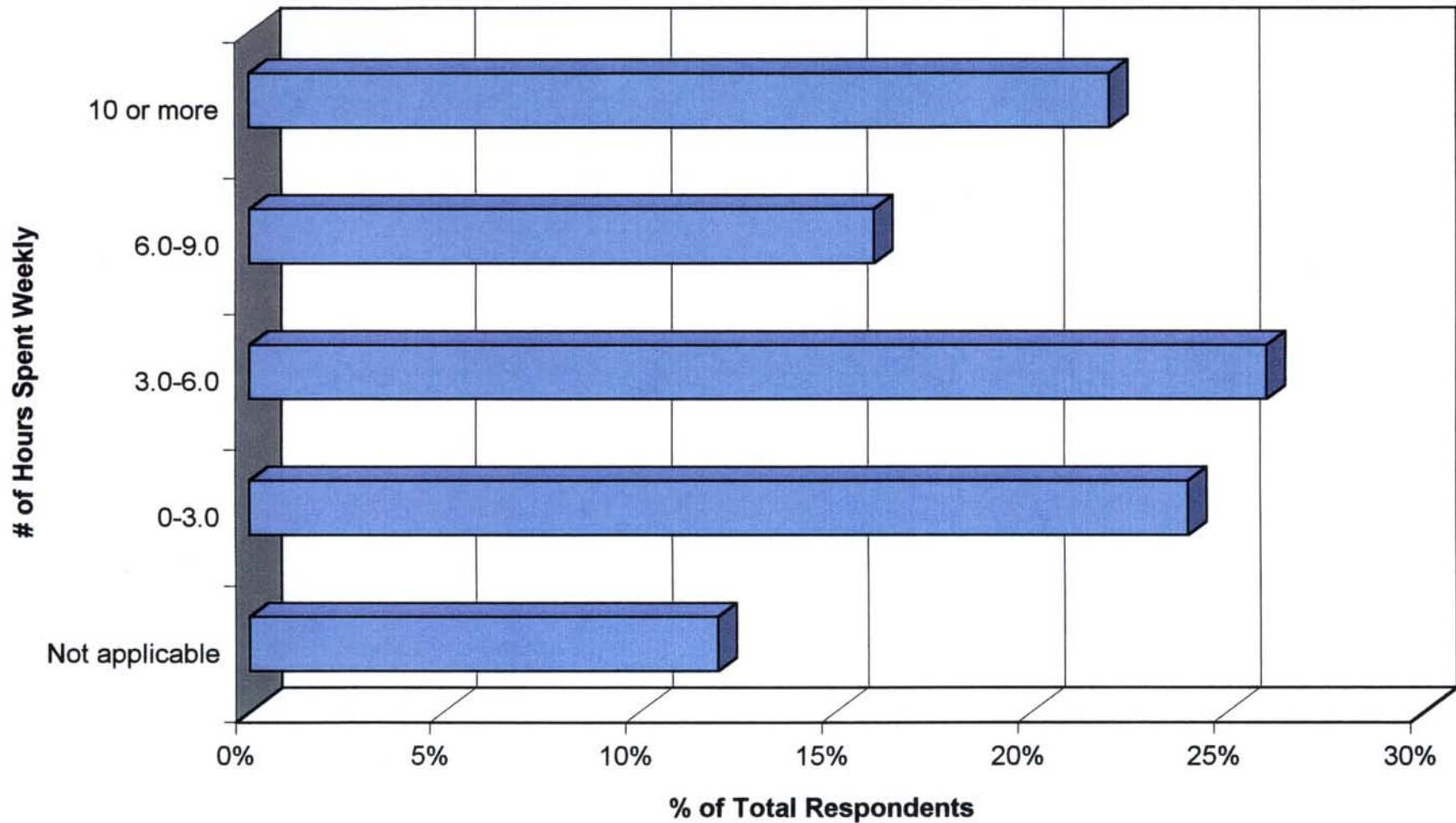


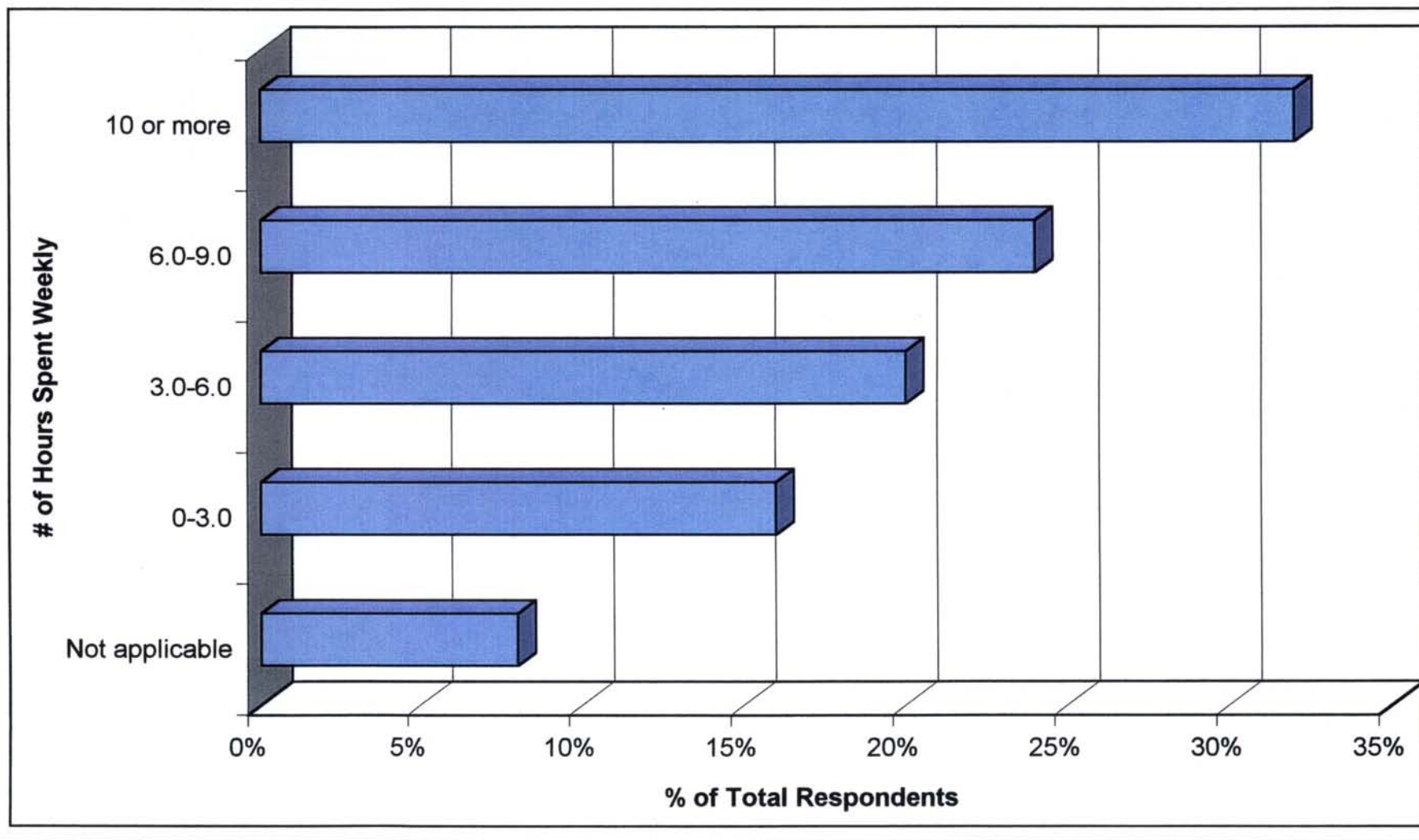
Figure 3: Graduate Students' GPA Ranges



**Figure 4: Hours Spent Weekly by Undergraduates
on Extracurricular Activities**



**Figure 5: Hours Spent Weekly by Graduates
on Extracurricular Activities**



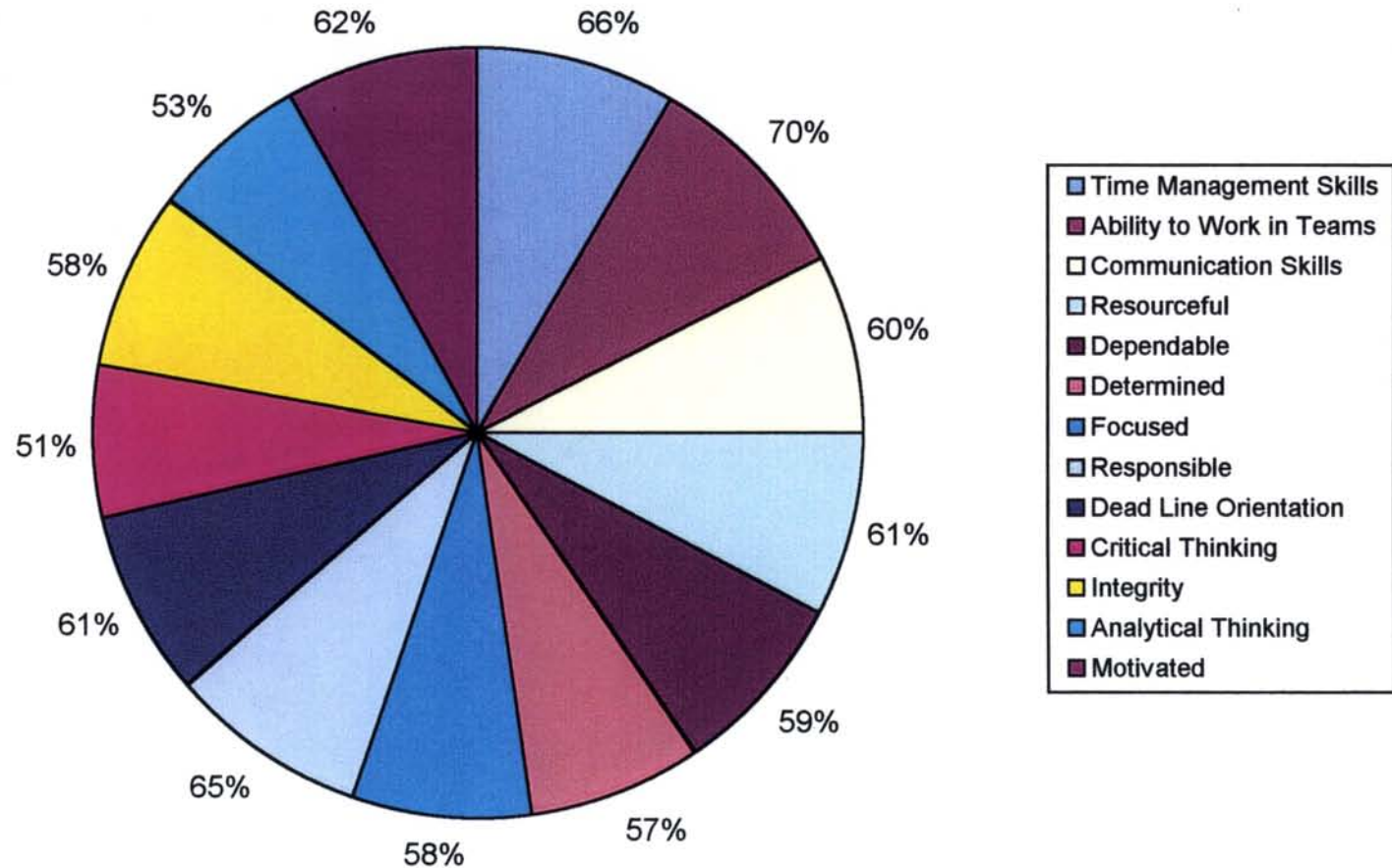
It was thought originally that the recruiter pool would provide the most different answers. It was assumed that because recruiters sought people to fill job positions, that they would want very well-rounded students. It was assumed that recruiters would rank such things as social skills, leadership, respect, communication skills, and cultural knowledge as more important than perhaps the faculty would. This was assumed because when a student takes a job they have to be able to work with a whole new and different group than they were accustomed to in college. However, what was surprising is that the recruiters who responded to the survey did not feel that things such as these were as important as it was assumed.

There were some responses from the different groups that went along with the original hypotheses. It was found that undergraduates felt that dead line orientation was very important. The other groups felt that it was important, but it was not rated with a five. Questions such as these were felt to be important to students because they take place right now. They are used to having to do homework, papers, and reports, therefore, being able to meet deadlines is important to them. Throughout the survey, the respondents answered in much this same way. Although the different groups would vary a little in the numbers of people who responded to a question a certain way, all classifications responded similarly to all of the questions.

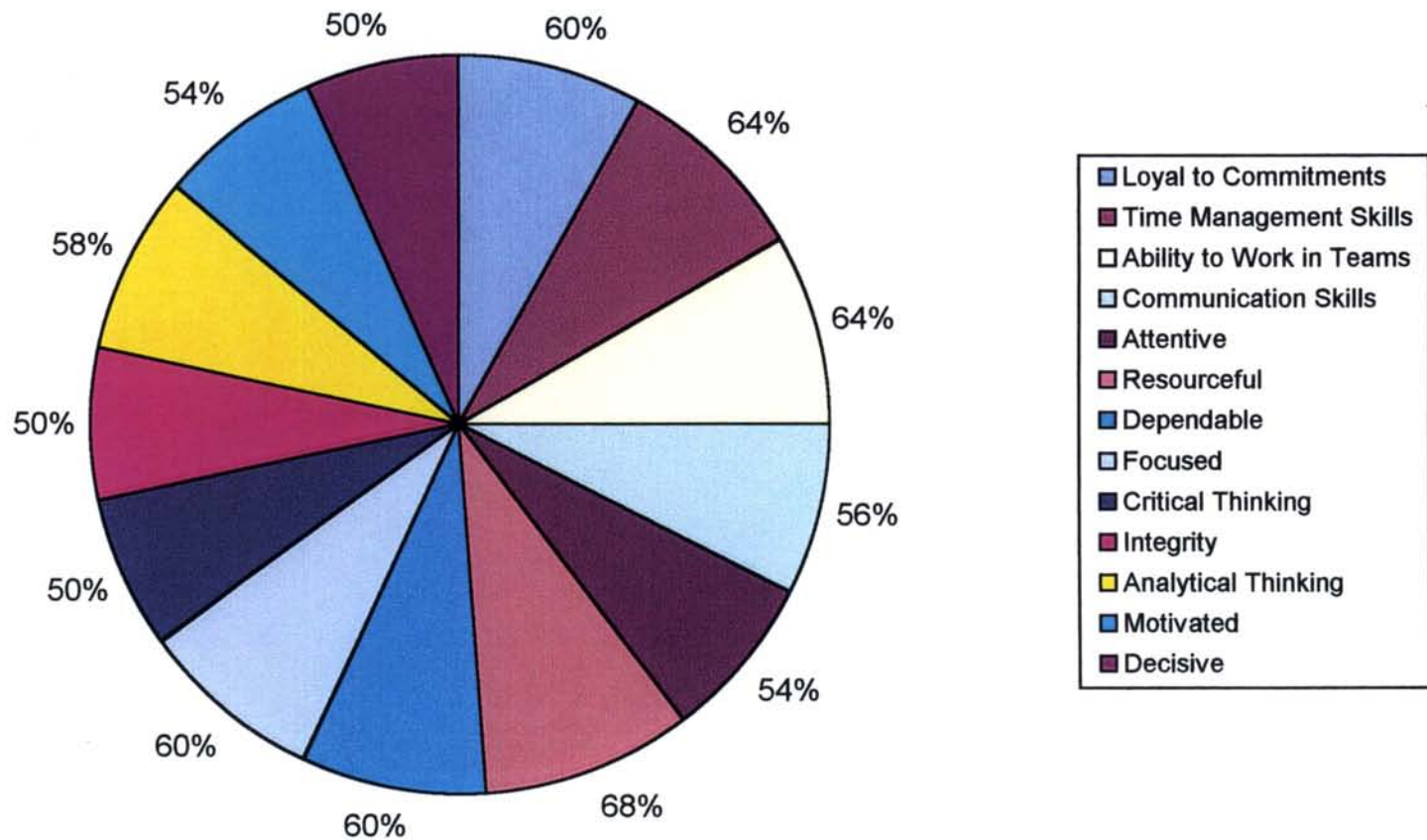
Each classification had a number of qualities that a majority of the respondents ranked as very important. For undergraduates and graduates a majority was determined by 50% or more of the total respondents selecting 5 as their answer. With the alumni, faculty, and recruiters a majority was determined as 40% or more. This is partly due to the small pools for faculty and recruiters, but also because it was determined that a

similar amount of attributes should be compared. The undergraduates, graduates, and faculty each had 13 skills and qualities ranked highest, while alumni and recruiters had 11 each. The skills and qualities ranked highest by each of the five classifications can be found in Figures 6-10.

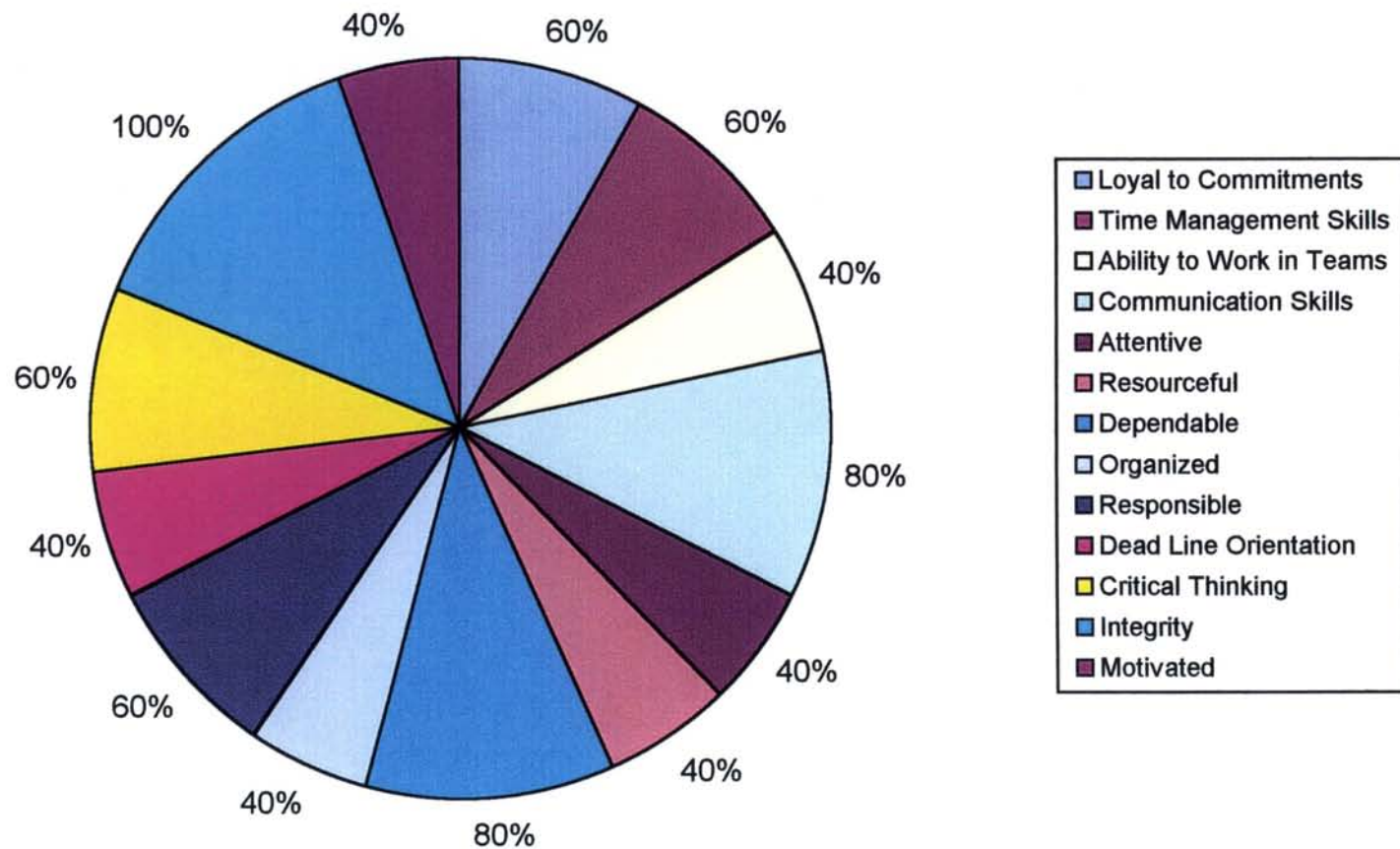
**Figure 6: Skills and Qualities Ranked Highest (5=Very Important)
by Undergraduates
(=>50% of Total Respondents)**



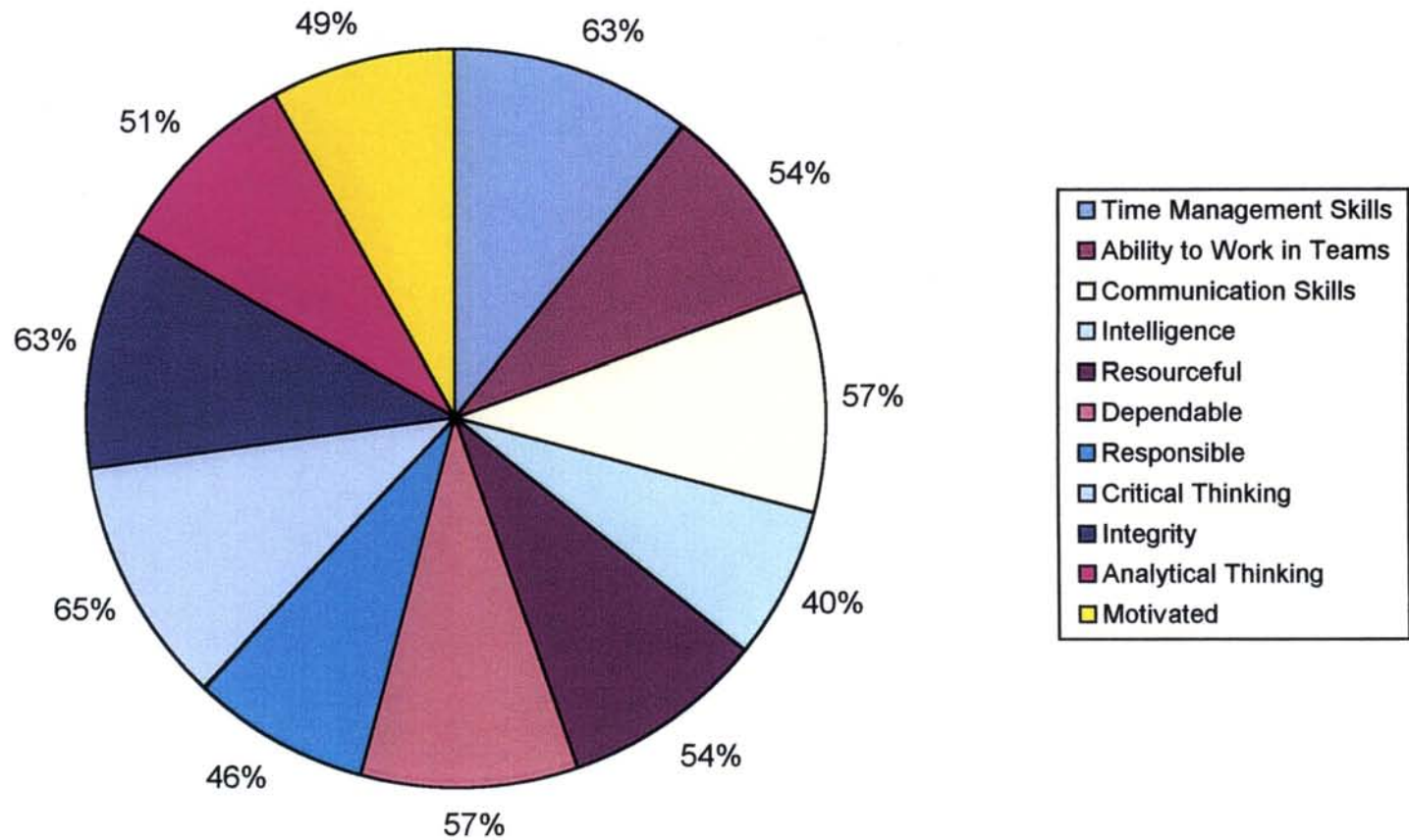
**Figure 7: Skills and Qualities Ranked Highest (5=Very Important)
by Graduates
(=>50% of Total Respondents)**



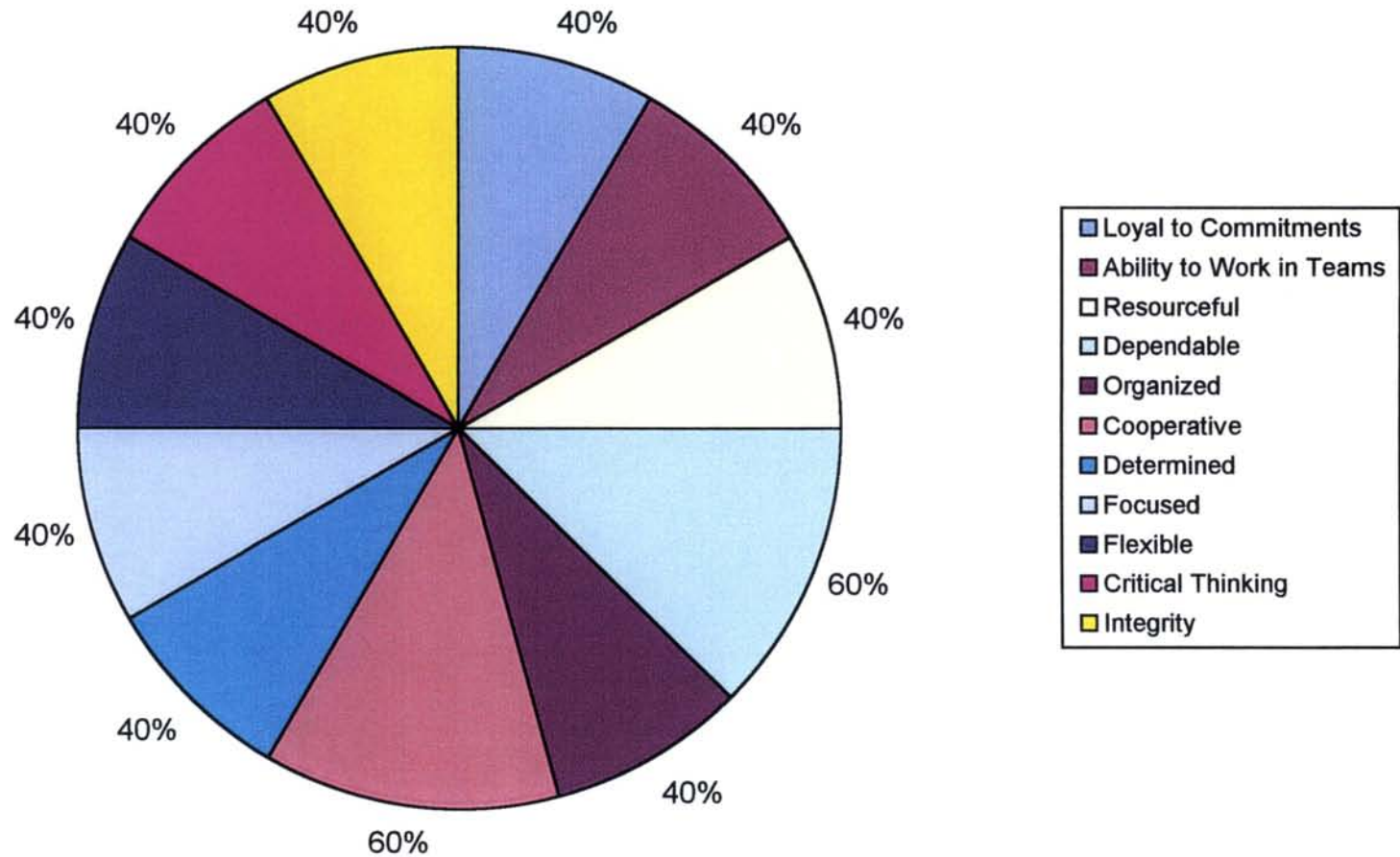
**Figure 8: Skills and Qualities Ranked Highest (5=Very Important)
by Faculty
(=>40% of Total Respondents)**



**Figure 9: Skills and Qualities Ranked Highest (5=Very Important)
by Alumni
(=>40% of Total Respondents)**

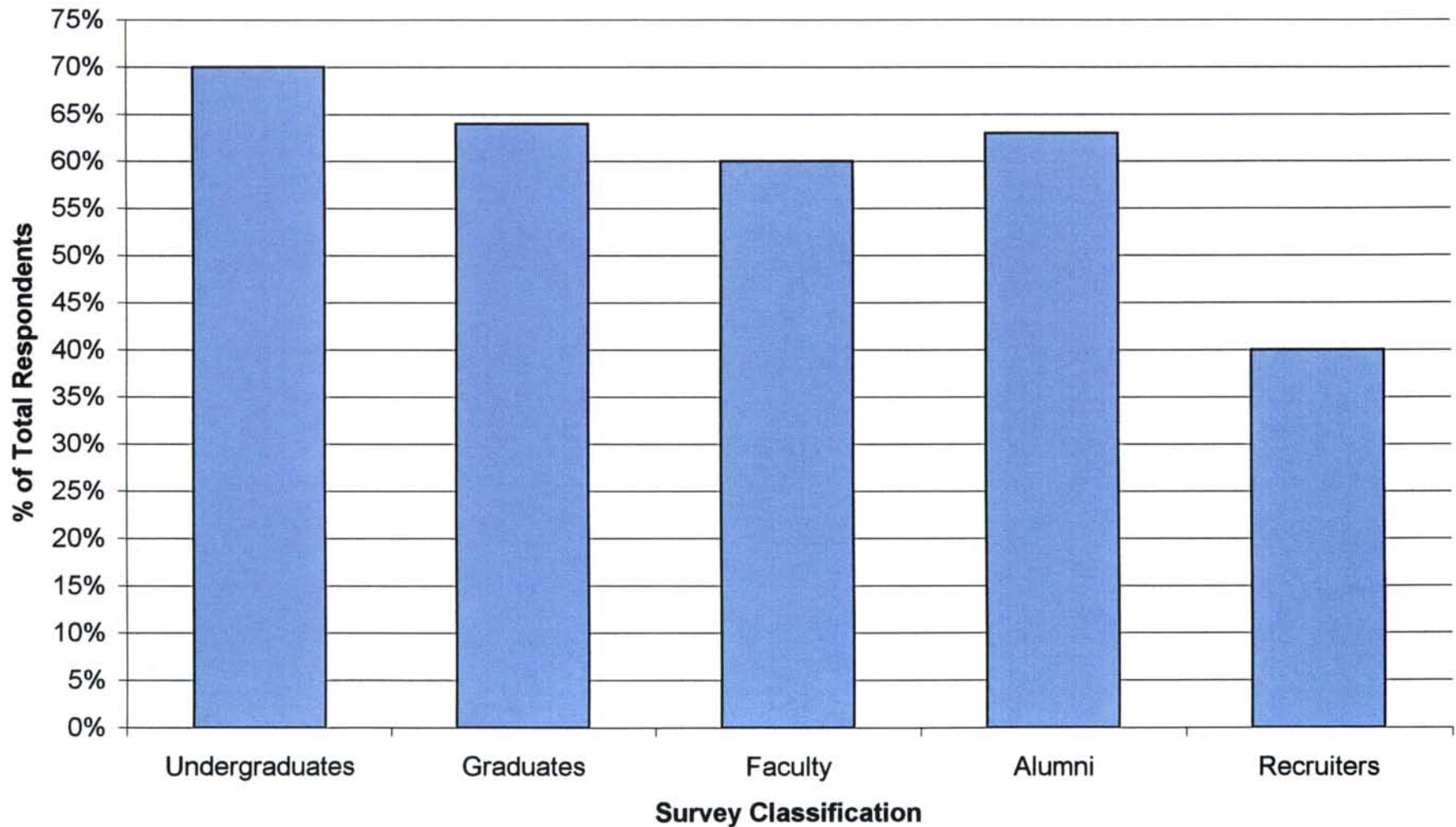


**Figure 10: Skills and Qualities Ranked Highest (5=Very Important)
by Recruiters
(=>40% of Total Respondents)**

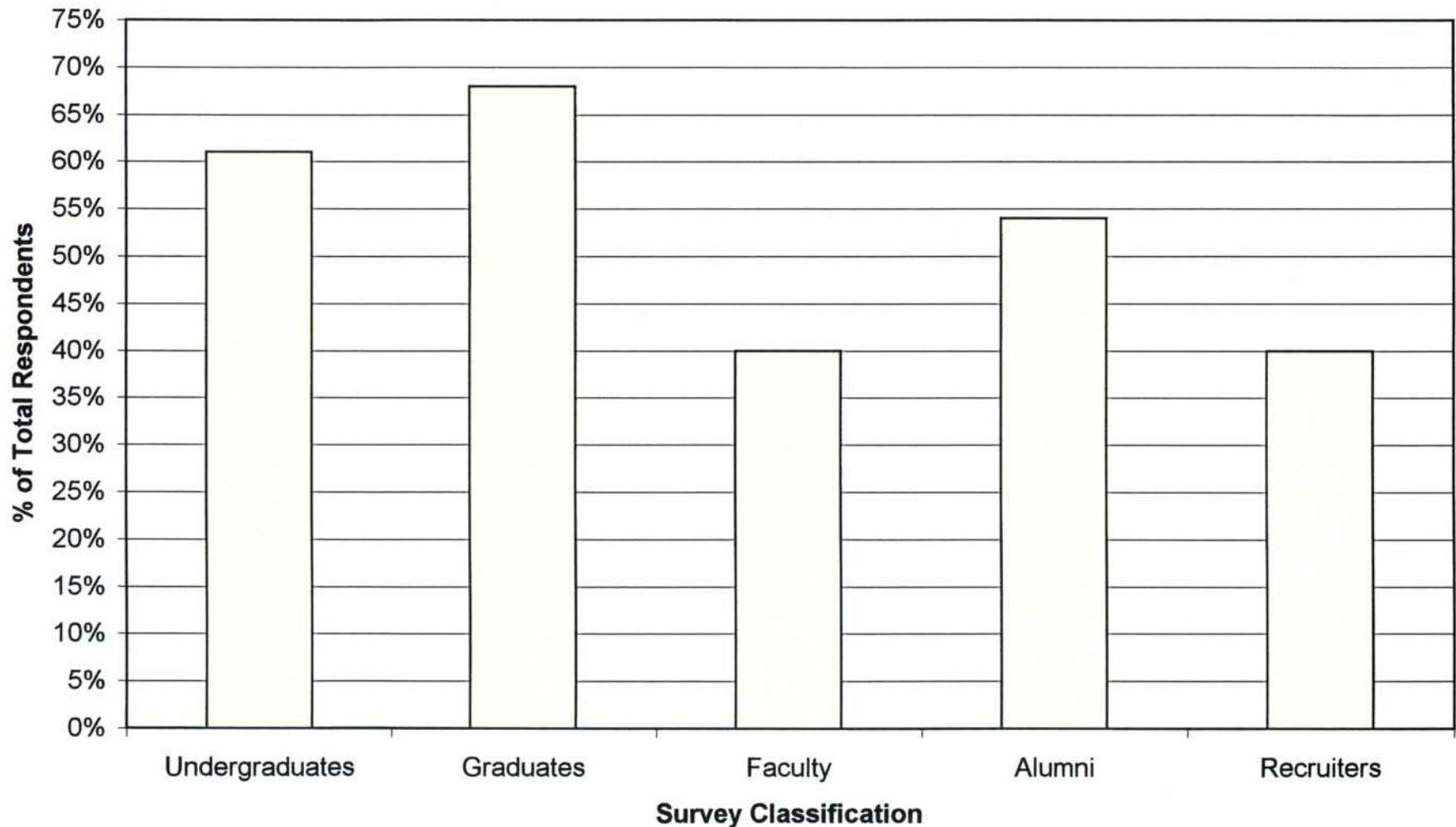


It was also determined from the data that was collected that out of the questions that each classification ranked as very important that there was some overlap. There were five qualities and skills that a majority of each of the five groups deemed as very important. These were the ability to work in teams, resourcefulness, dependability, critical thinking skills, and integrity. The percentages for each group are shown graphically in Figures 11-15. The total number of respondents for each group is shown in table form in the Appendix.

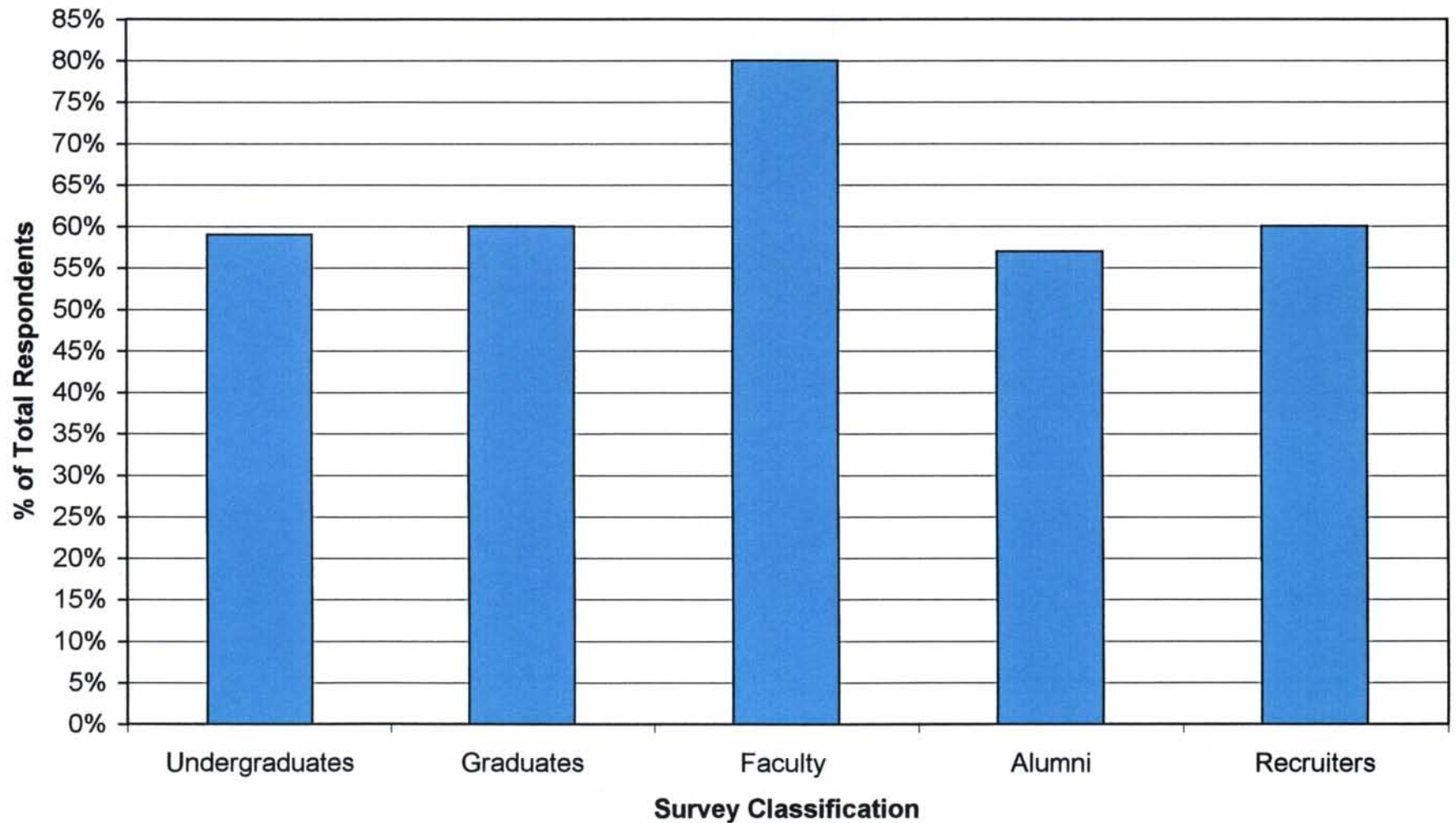
**Figure 11: Skills and Qualities Ranked Highest by a Majority in All Classifications
#3-Ability to Work in Teams**



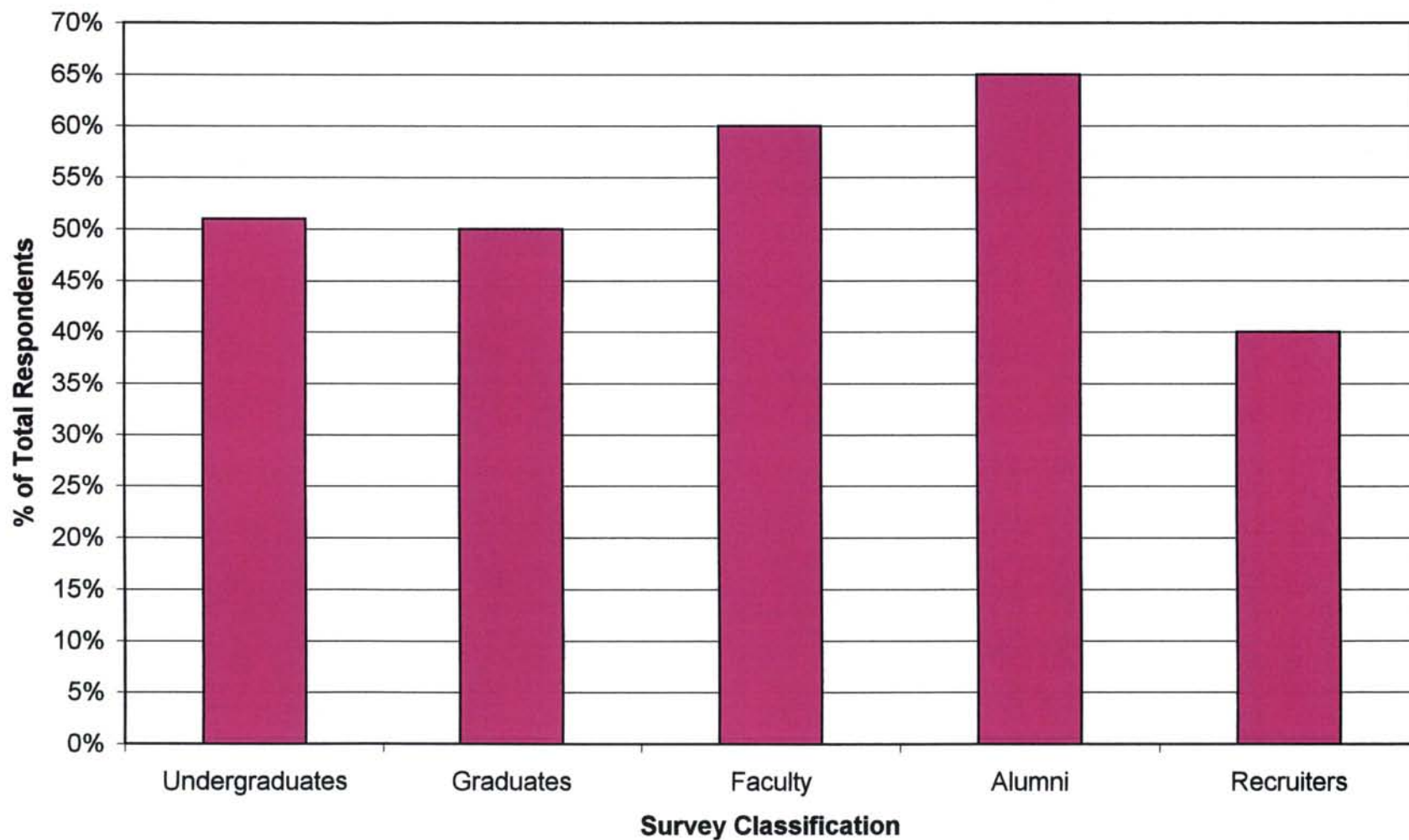
**Figure 12: Skills and Qualities Ranked Highest by a Majority in All Classifications
#11-Resourceful**



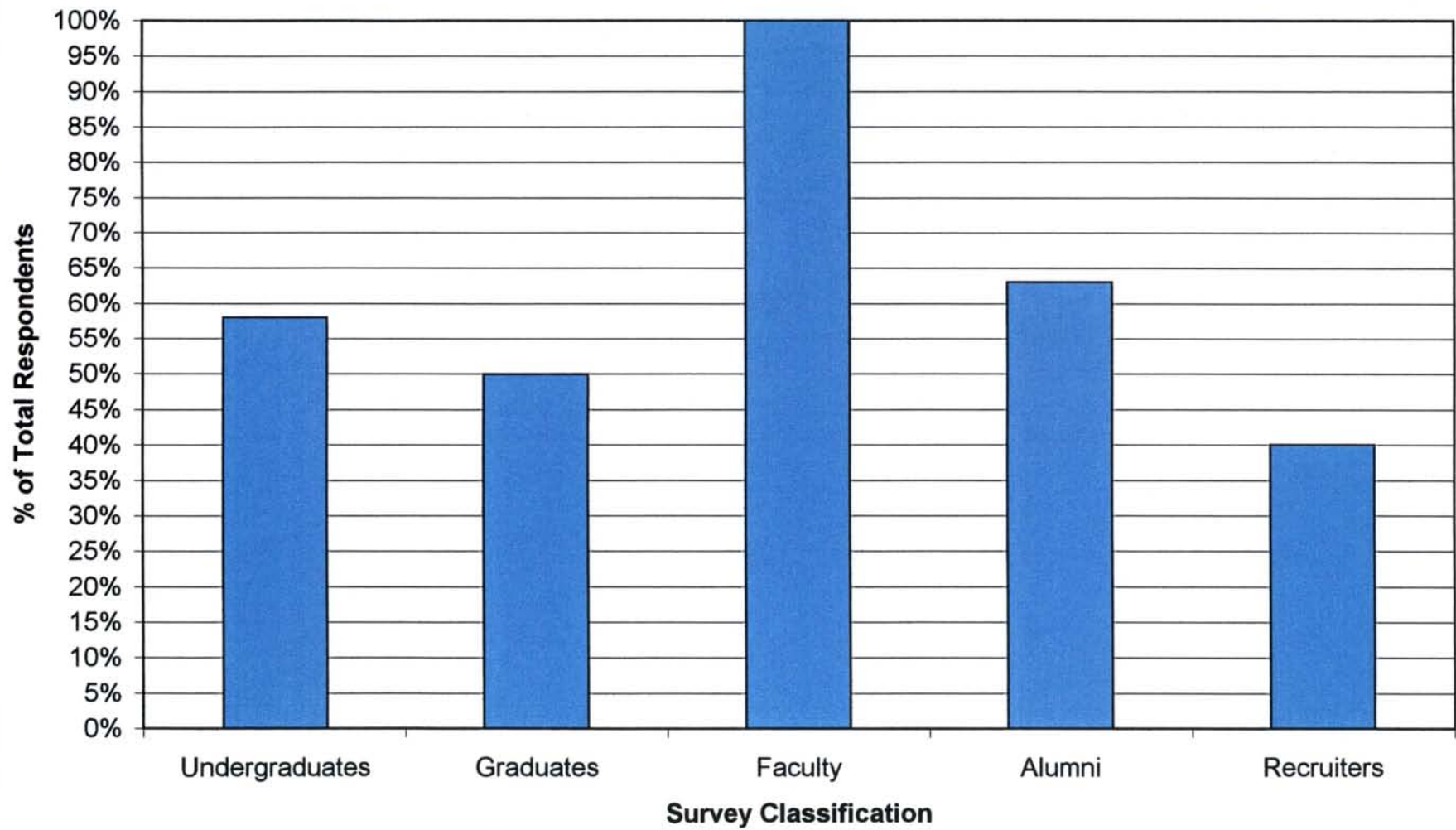
**Figure 13: Skills and Qualities Ranked Highest by a Majority in All Classifications
#12-Dependable**



**Figure 14: Skills and Qualities Ranked Highest by a Majority in All Classifications
#27-Critical Thinking**

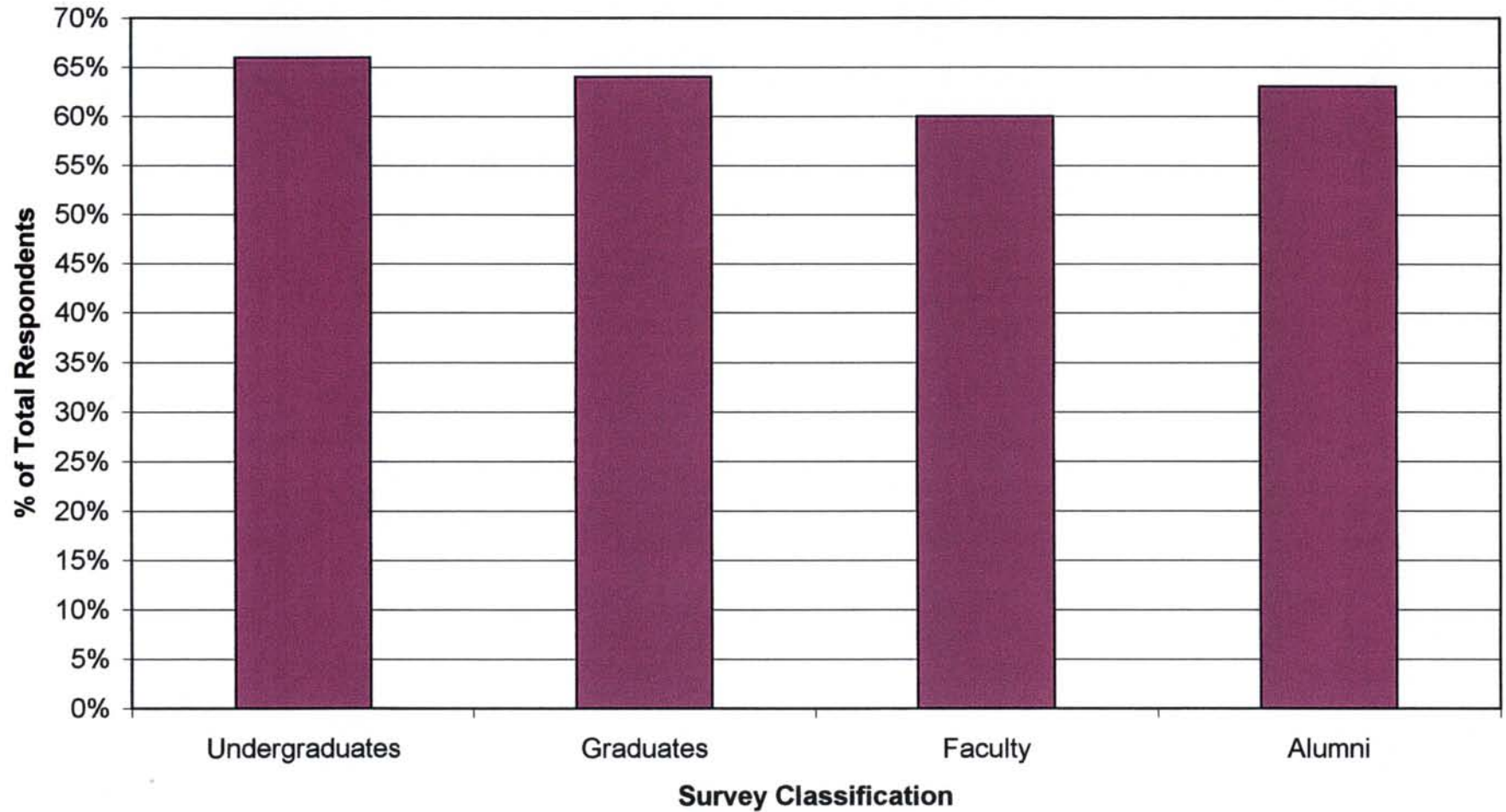


**Figure 15: Skills and Qualities Ranked Highest by a Majority in All Classifications
#28-Integrity**

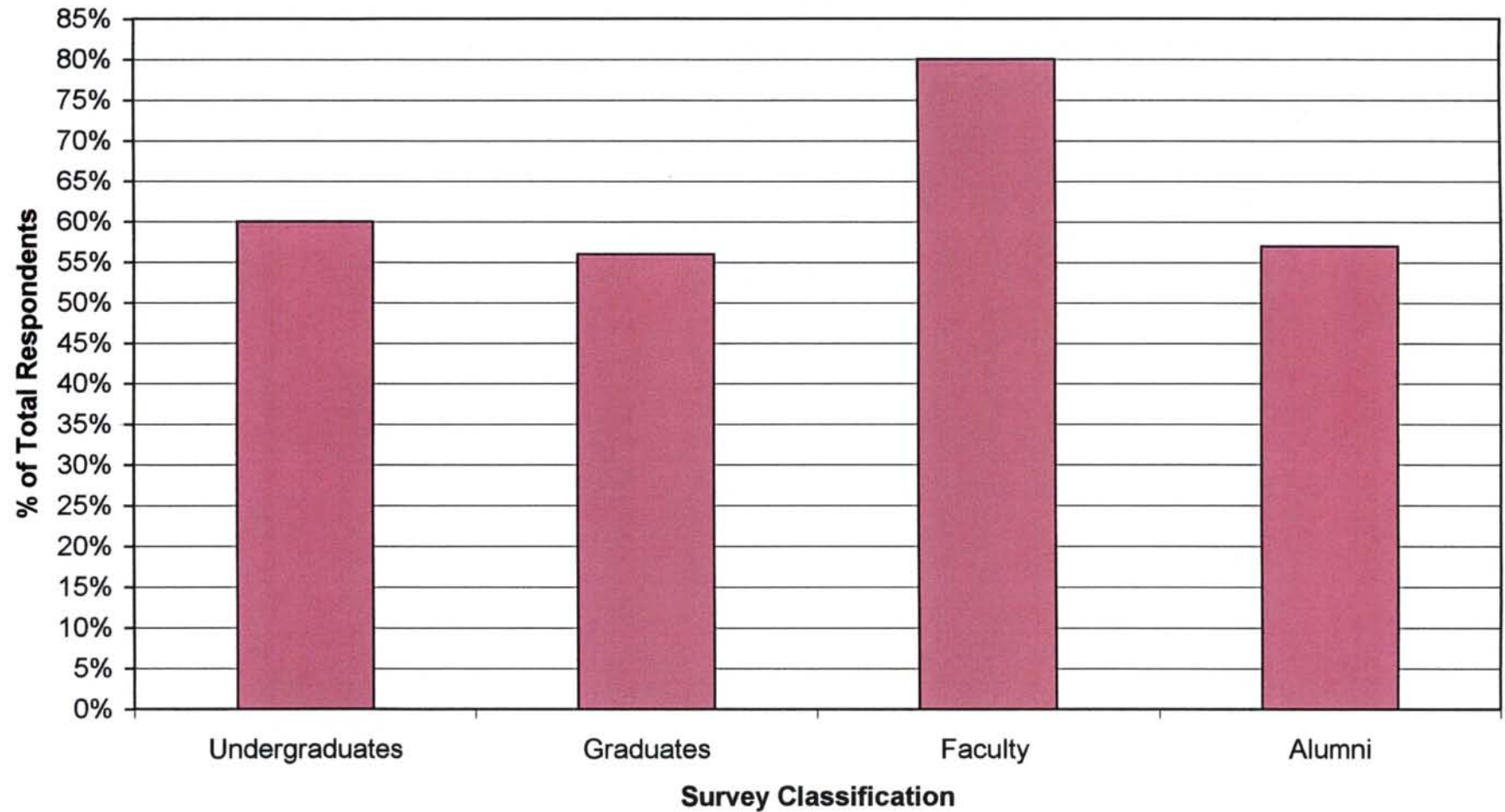


Also, related to each other were three additional attributes that the four groups most closely associated to the University felt were very important. These were time management skills, communication skills, and being motivated. These were included because undergraduates, graduates, faculty, and alumni have a direct link to the chemical engineering program at the University. In addition, the skills and qualities that these four groups agreed upon are very important to a student's education today. It is interesting to note that these are three things that you would expect recruiters to pick as very important also. However, with this collection of data that was not the case. A most probable cause of this is the small sample with which recruiters responded. These comparisons of the extra three attributes with their percentages of total respondents are shown in Figures 16-18.

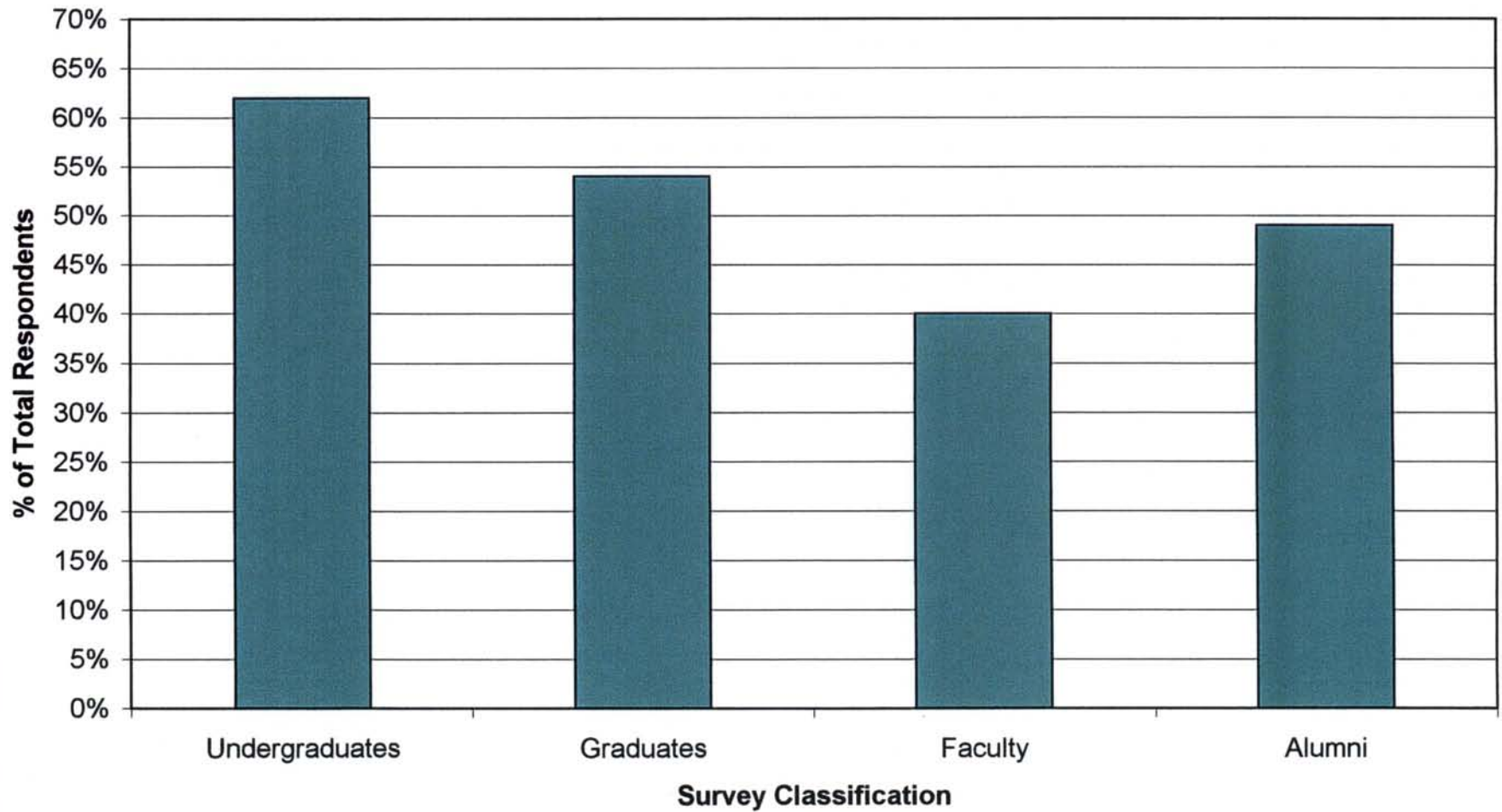
**Figure 16: Skills and Qualities Ranked Highest by All Classifications Directly
Associated to the University
#2-Time Management Skills**



**Figure 17: Skills and Qualities Ranked Highest by All Classifications Directly
Associated to the University
#4-Communication Skills**



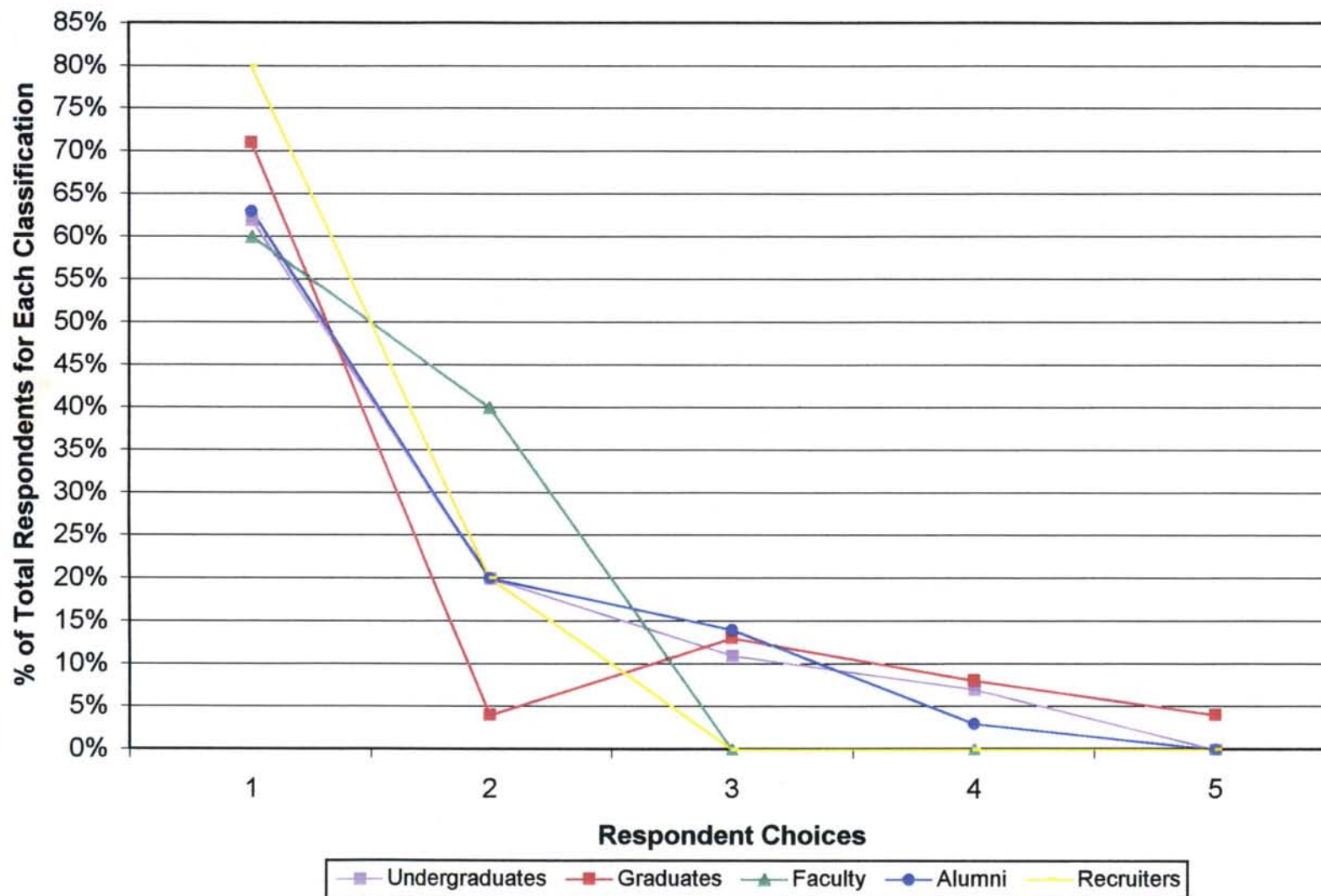
**Figure 18: Skills and Qualities Ranked Highest by All Classifications Directly
Associated to the University
#37-Motivated**



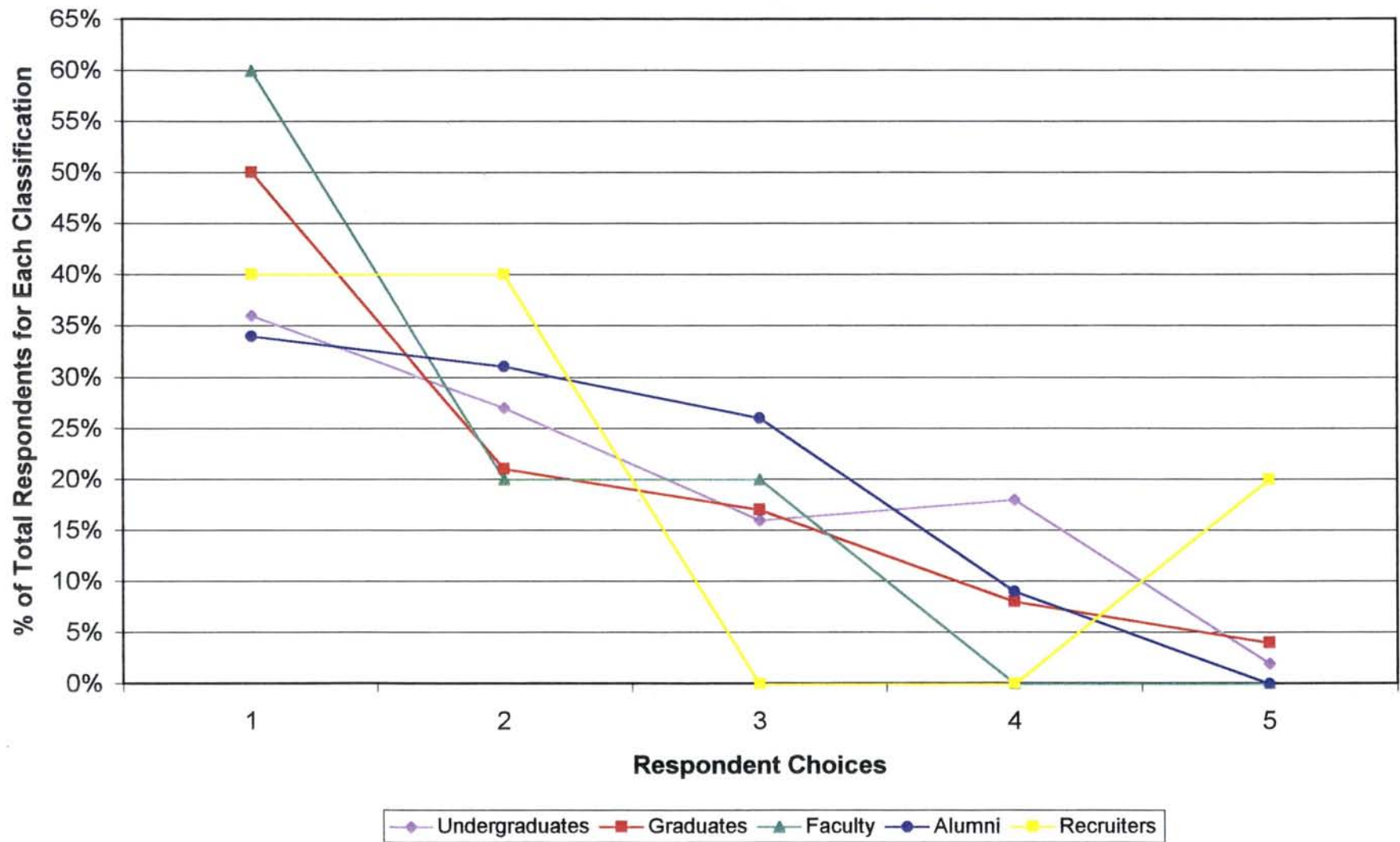
This survey also contained 12 questions that pertained to different activities found on campus. The answering system was the same as with the attributes. Each of the five groups was to rank the activities from not important to very important. This information was sought to determine whether or not particular activities were more important than others. It was assumed things such as internships and co-op would rank higher than student government and community service. The data collected proved these assumptions to be true.

The only activity that all classifications had a majority of respondents agree was very important was co-op. This was as expected. There were a few activities that had mixed reactions. The majority of graduates ranked being involved with a student publication as a 4, while the rest of the groups gave in a 2 or lower. On the whole, all of the survey classifications ranked the majority of the activities as not being very important. It can be argued that they feel that it is important to be involved in order to be well-rounded, but that these particular activities associated with the survey are not necessarily the appropriate ones. The data collected for each sample is shown in table form in the Appendix. Each activity question and the percentages for each answer (1-5) for each group are shown in Figures 19-30.

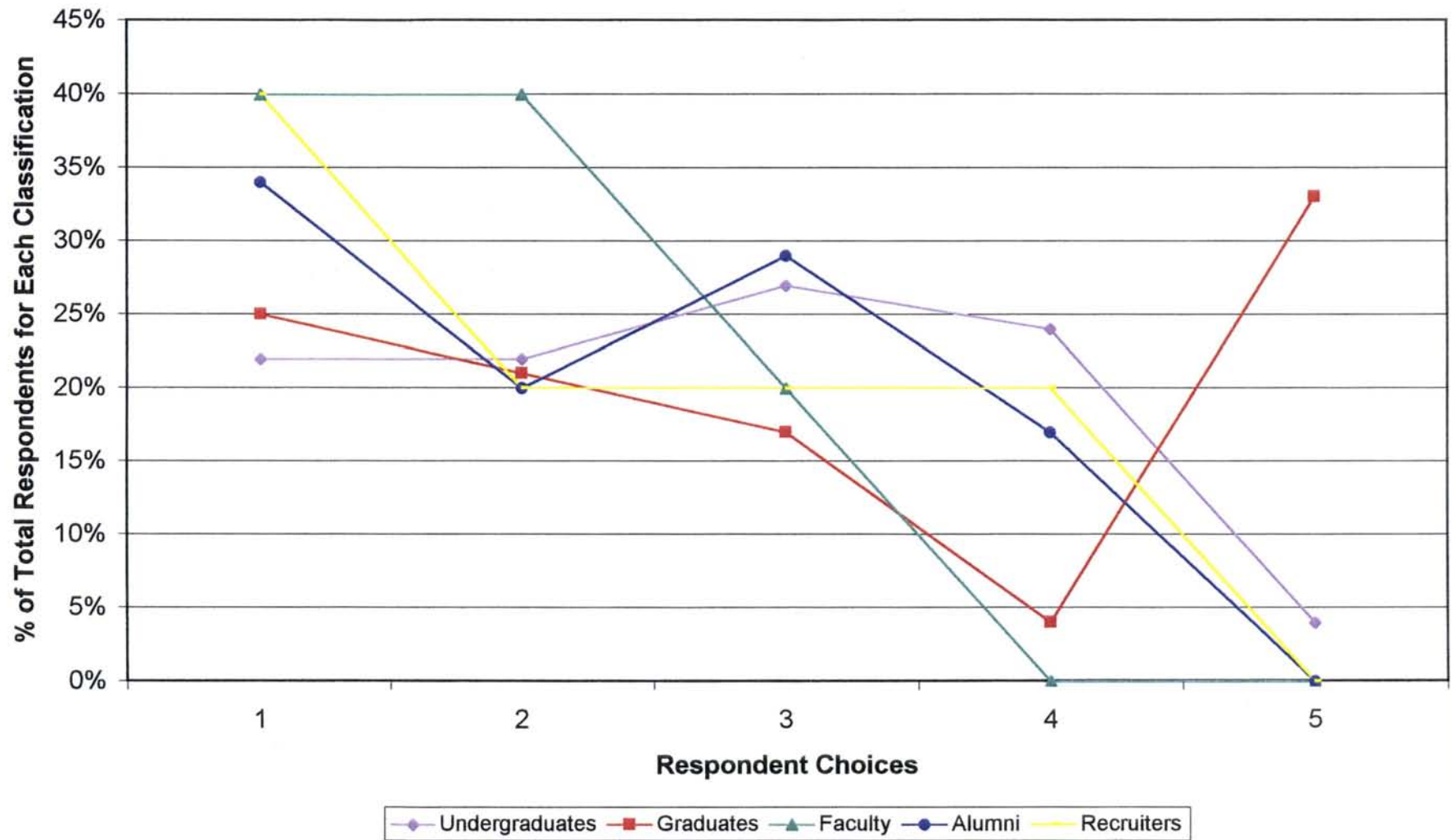
**Figure 19: Classification Comparisons for Activities
#43-Fraternity/Sorority**



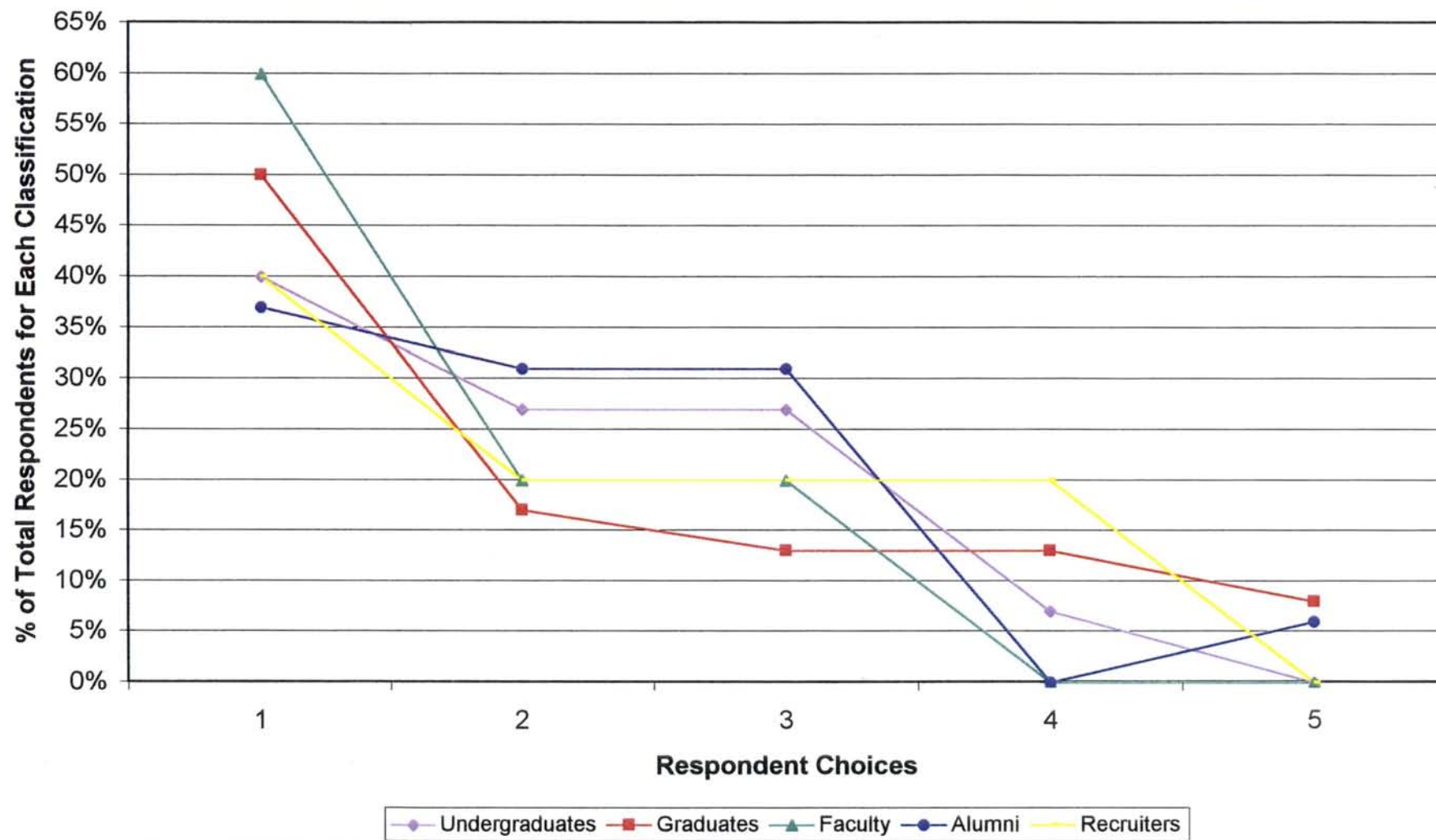
**Figure 20: Classification Comparisons for Activities
#44-Student Government**



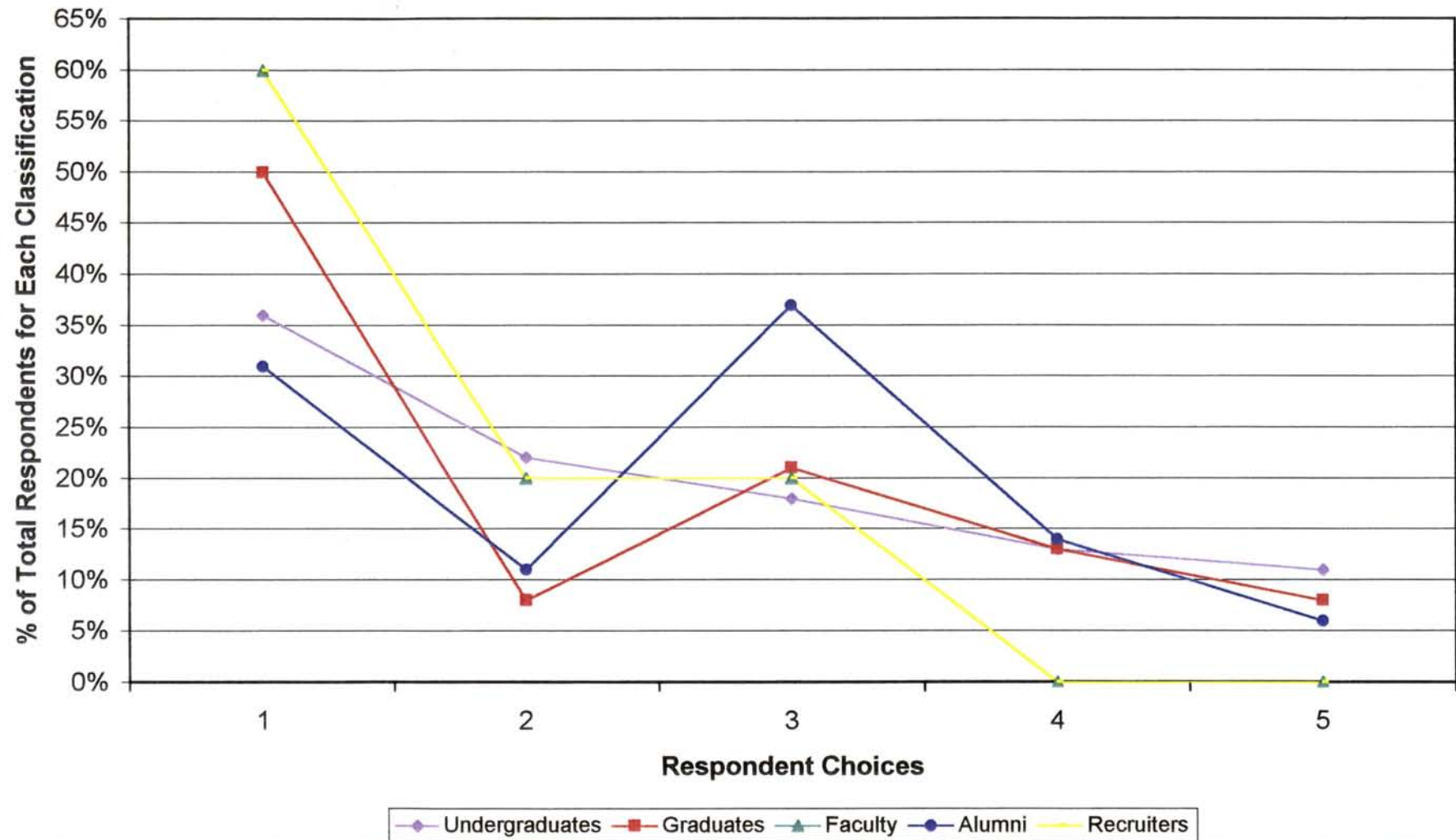
**Figure 21: Classification Comparisons for Activities
#45-Team Sports**



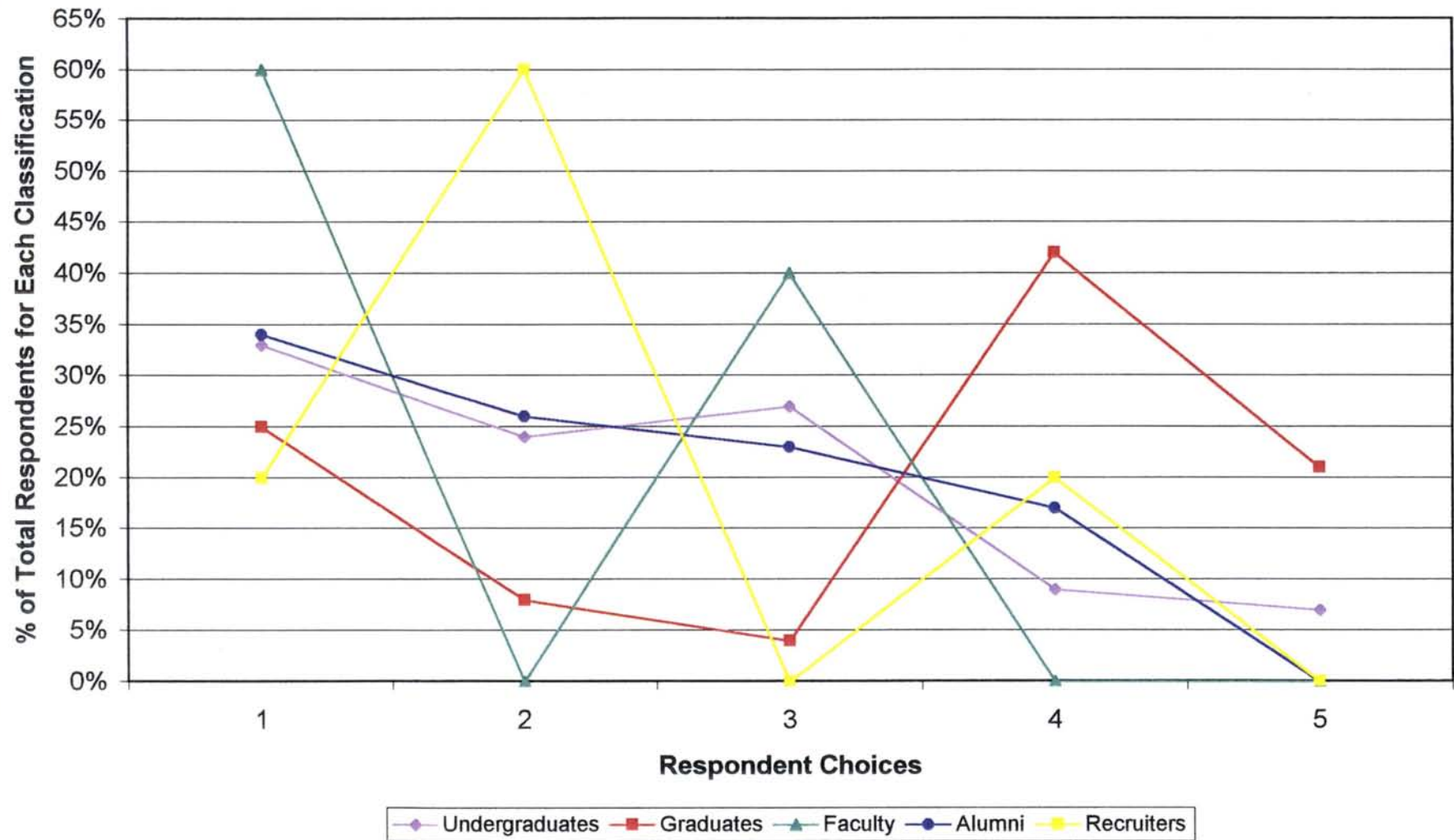
**Figure 22: Classification Comparisons for Activities
#46-Political Organization**



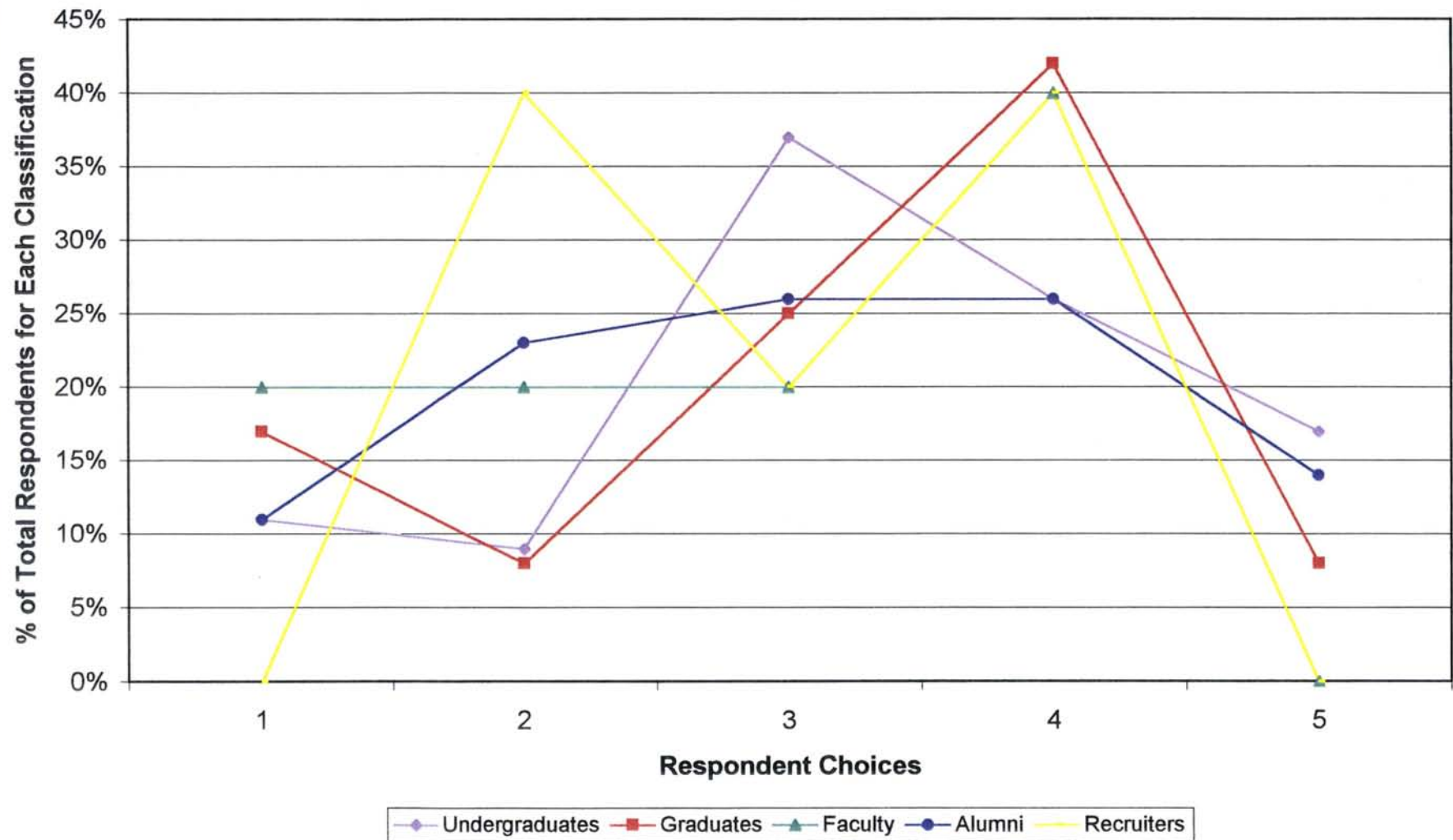
**Figure 23: Classification Comparisons for Activities
#47-Religious Organization**



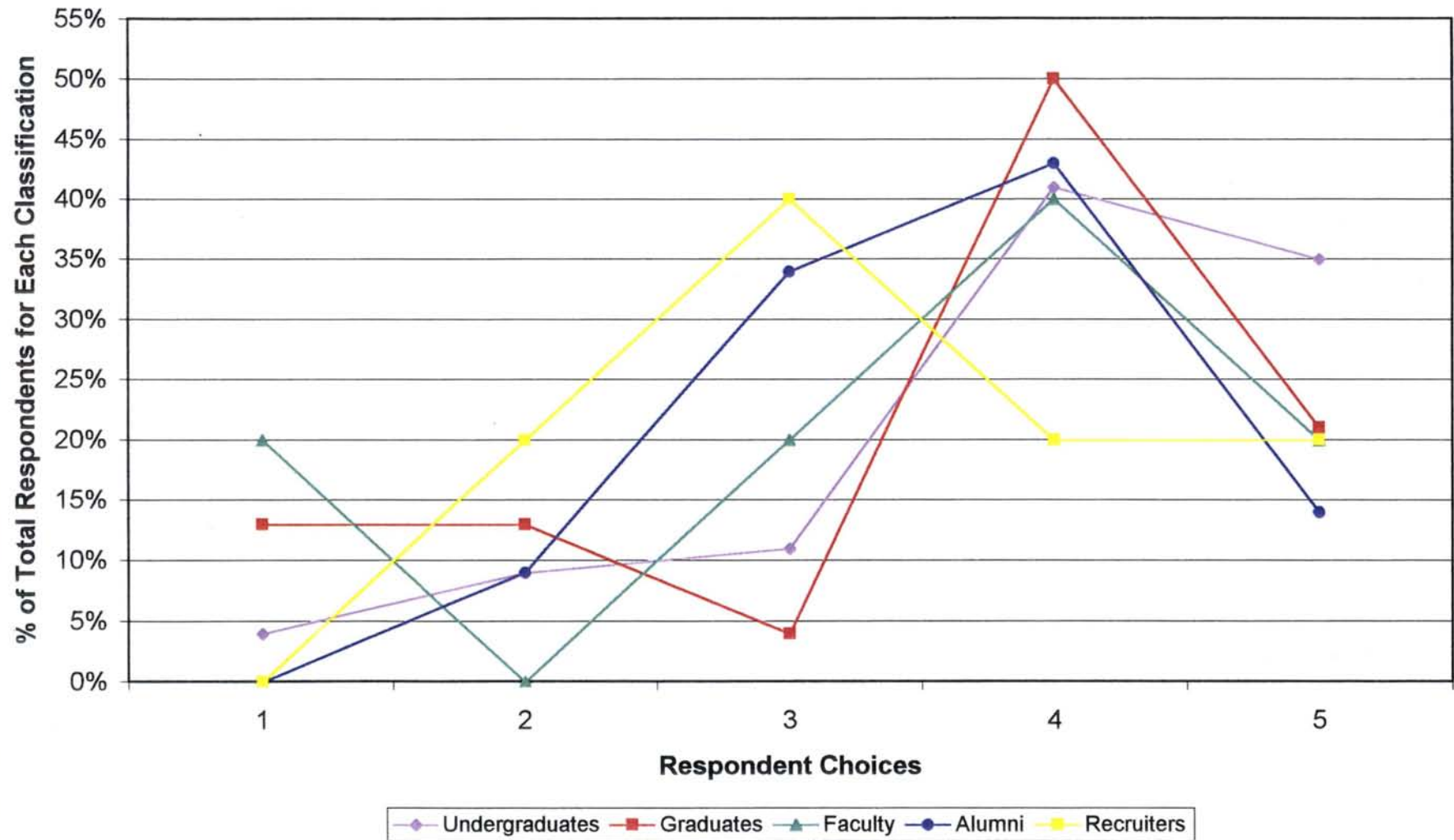
**Figure 24: Classification Comparisons for Activities
#48-Student Publication**



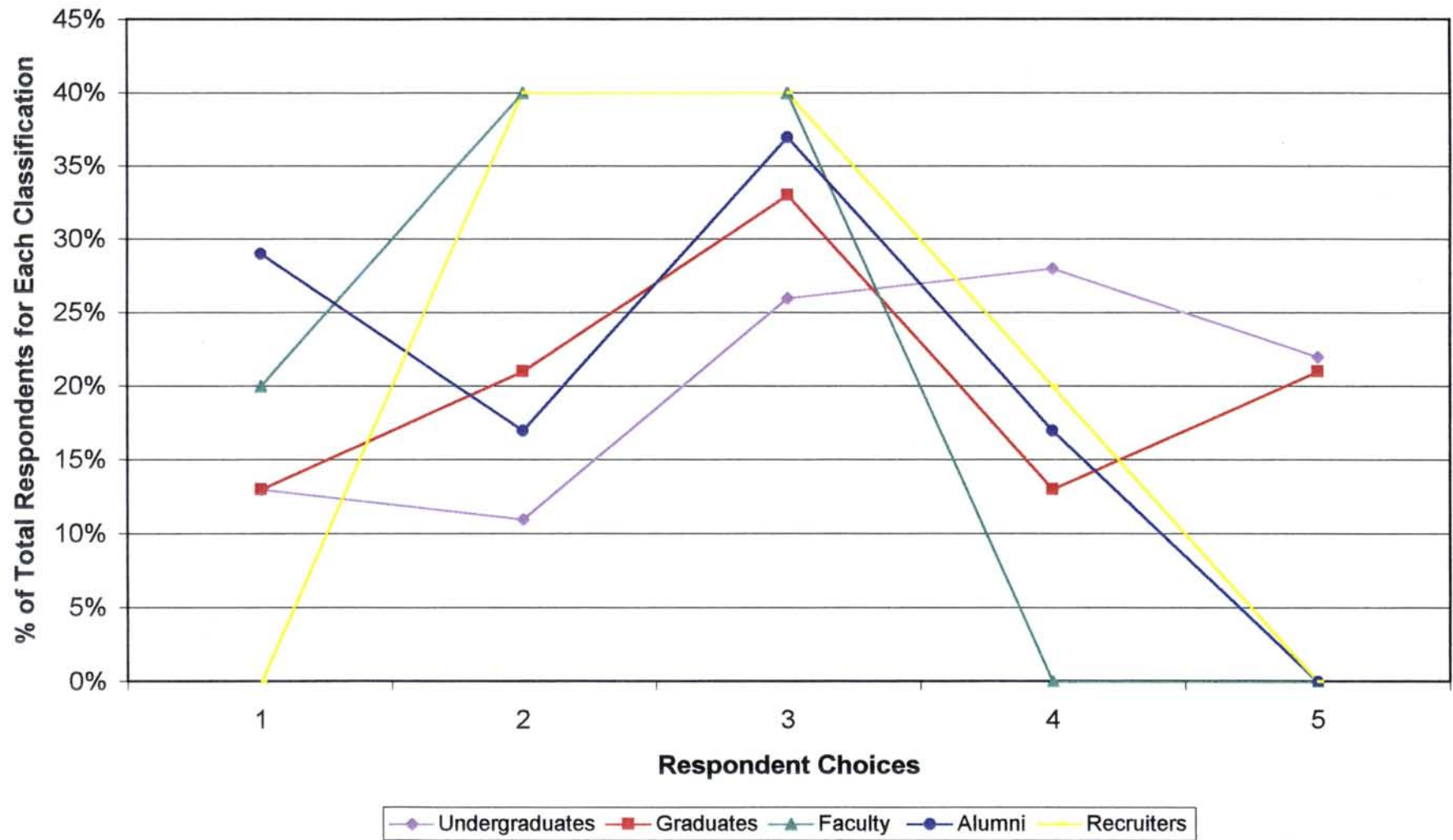
**Figure 25: Classification Comparisons for Activities
#49-Community Service**



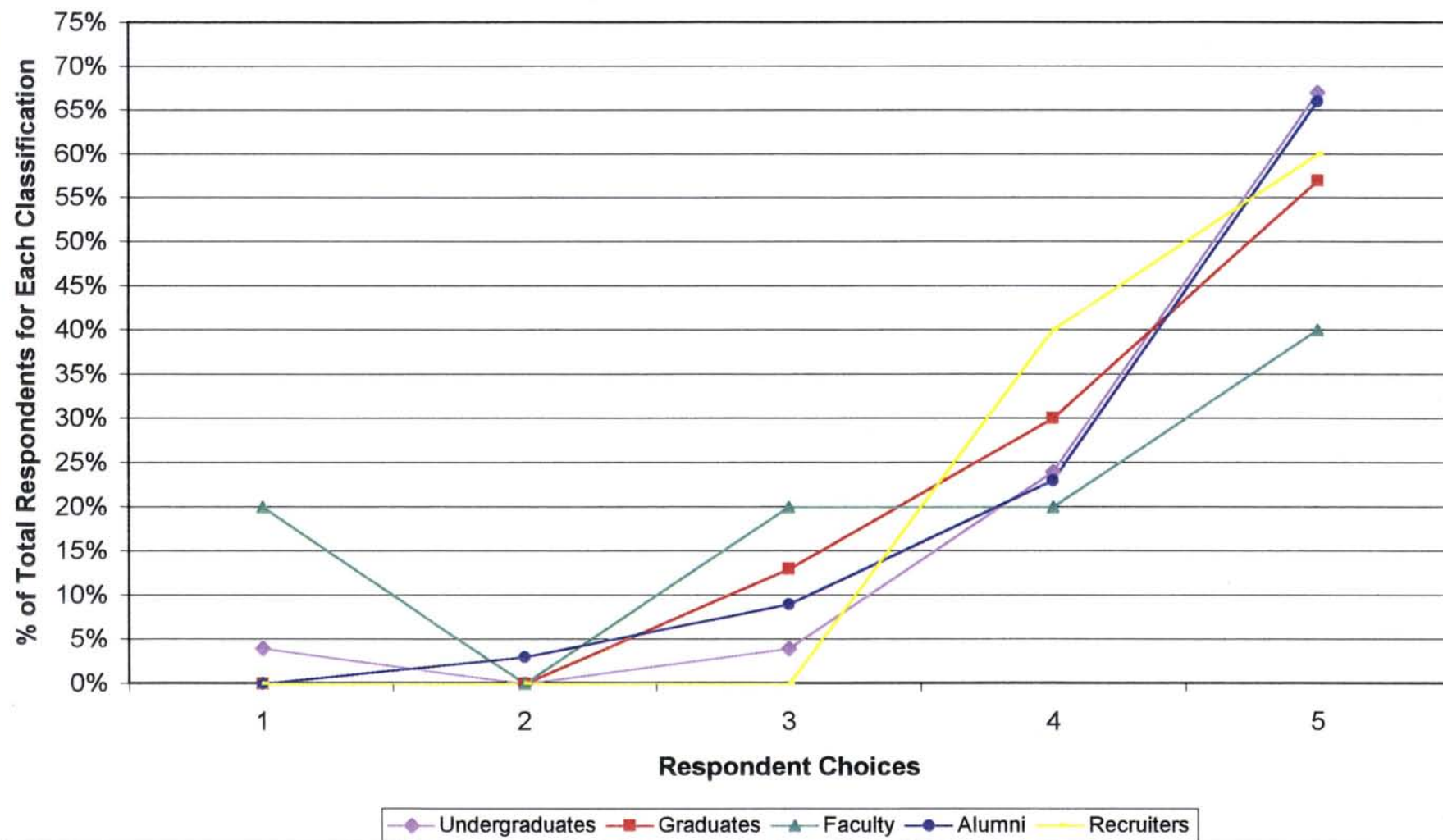
**Figure 26: Classification Comparisons for Activities
#50-Departmental/Major Organization**



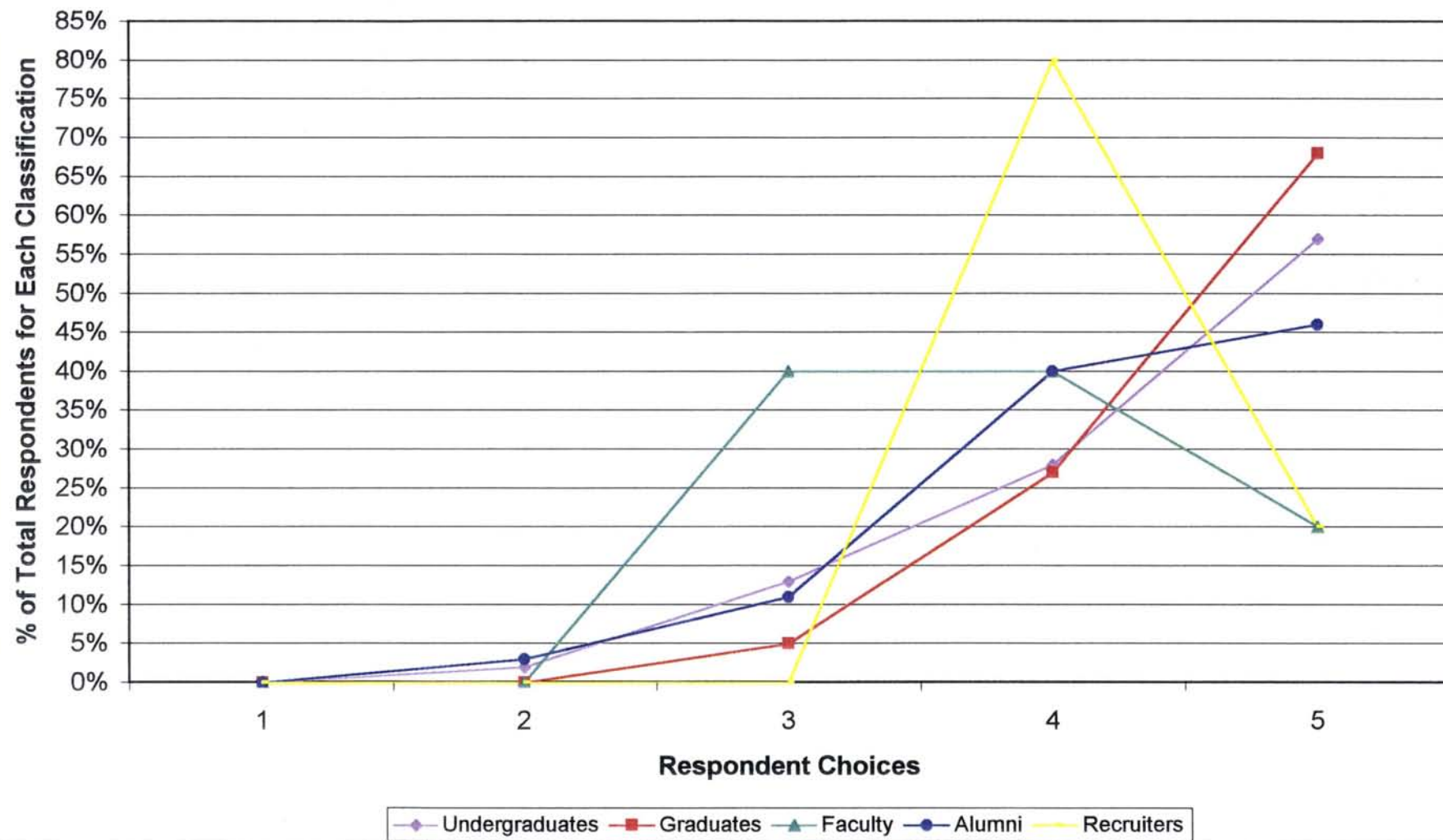
**Figure 27: Classification Comparisons for Activities
#51-Campus Organization**



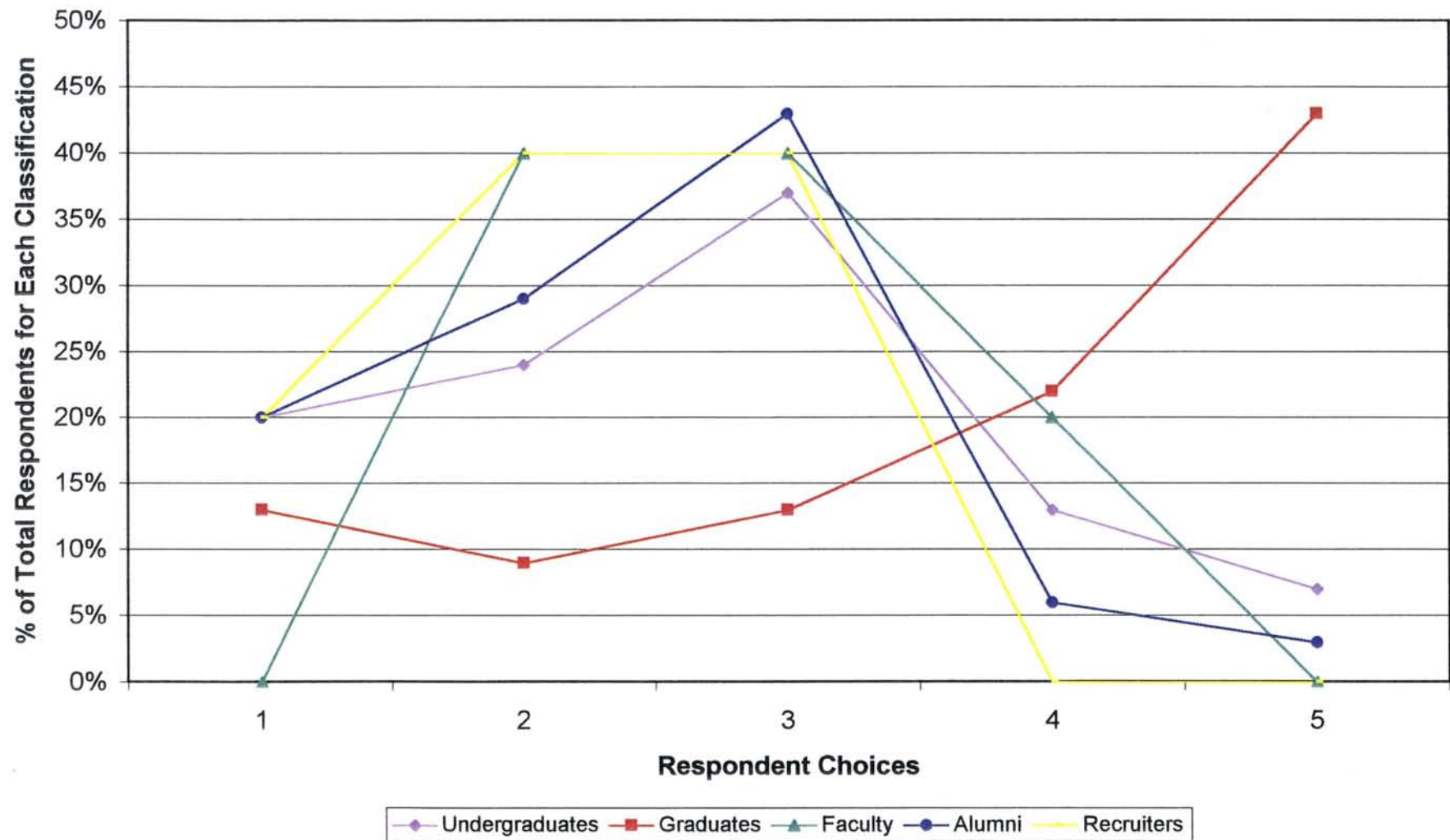
**Figure 28: Classification Comparisons for Activities
#52-Co-op**



**Figure 29: Classification Comparisons for Activities
#53-Internship**



**Figure 30: Classification Comparisons for Activities
#54-Study Abroad**



There are many conclusions that can be drawn from this report. First, that a more thorough survey should be conducted in order to obtain true values for each question and for each classification. As with all surveys, there is room for a lot of error and this survey was no exception to this rule. As an original project and survey, there is plenty of room for things to be altered in order to make them better. On the survey itself, there is a place for the respondents to email the designer if they have questions or comments. Several people took advantage of this opportunity. These emails can be found in the Appendix. Although many of these people had very good suggestions for editing the survey to make it better, it was decided that the survey would not be changed because people had already begun to respond. It was felt that this would be another huge source of error and it would badly skew the first collection of data.

With this project it was also found that a lot of inferences could be made as to why each classification ranked the attributes and activities as they did. However, by doing this, it would bring in personal opinion as to why 120 people think the way that they do. There is also such a huge amount of information that it would be impossible to take each question and determine the cause of each of the five group's rankings. This survey is useful in the fact that it shows that what a normal person can assume is important to a college student and more particularly a chemical engineering student is correct. However, some of the assumptions that could be made about students involved in science-related fields can also be proved. Things such as social skills, which in the real world are necessary, were not ranked very highly by any of the classifications. This was true for a number of the qualities and skills.

To be able to be very effective, this survey should be conducted in an atmosphere that is not confidential. Names would not have to be used, but it would be necessary to have some type of identifying question to be able to eliminate duplicate responses. There should also be a way for a person to explain why they did or did not rank something highly. There should also be a value set for each ranking. By letting the individual determine for oneself, the data was skewed. There should also be a clause or some type of factor that would kick the data out of the system if the survey was not answered in its entirety. To make it useful in all realms of chemical engineering, there should be a larger pool for every classification. Although undergraduates had the most respondents, it was not even half of the enrolled students in the chemical engineering program.

The information that was found in this report can still be useful to the chemical engineering department in a number of ways. First, the department will be able to reiterate to students in the classroom setting what they are already learning. Things such as team work and cooperation are very important in the engineering work place and by stressing it in college, the students have a head start on their colleagues. Second, the department can determine what students feel is important and perhaps stress to the faculty that they can use these skills more in the classroom. If students feel it is important to be resourceful, the professor could assign a project that would allow students to determine their own ideas and the way to go about completing the project. Third, the department can determine from the alumni sample's answers what becomes more important to a person after they leave college and enter the work place. Finally, the department can use this information to better the entire program. By allowing faculty to understand that there are differences among what all groups think is important to being an "ideal" chemical

engineering student, perhaps, they will not be as set in their ways and open up their offices and classrooms to new ideas from students, alumni, and recruiters.

It is hoped that the information found in this report will become of great use to the department. If not for the data collected in it, for the idea that more studies such as this need to be conducted in order to keep the program up to date and up to everyone's standards. Although there was room for error, there was also room to find things out about how different groups of people relate certain skills and qualities.

Chapter 4: Sources of Error

In this project, it was determined that there were several possible sources of error. These errors come from different aspects of the web-based survey, human mistakes, and misleading information. This project was developed from a number of ideas. Also, because it is a completely original project design, there is always room for improvement.

As is the case with all surveys, there is room for a lot of error. This survey was conducted as a totally confidential survey, which means that there were no identifying questions. Thus, it was possible for a student, etc. to complete the survey more than once. Another problem associated with the data was the fact that even if the survey was not 100% completed, it could still be submitted into the data results web file. Still, another source of error with the data was non-responses. If a question was not answered, a 0 was recorded as the answer, which was not included in the final report of data, thus, skewing the number of responses for each question. There was also the problem of people responding to the survey, but either accidentally or purposefully missing a few of the questions. Therefore, there would be 0's recorded in their line of data.

There were many possibilities for human mistakes as well. The data collected from the survey was entered into computer spreadsheets by hand which could have caused some simple error. When the respondents submitted the completed surveys they were sent to a separate web page in a results format. This page was then at various times submitted to an email account, which is where the answers were saved and printed out. The data could also have been skewed by respondents not understanding certain words and therefore, answering the questions with random rankings. A major source of misunderstanding could have come from the rankings themselves. Each question had a

scale to rank the questions on from 1 (not important) to 5 (very important). These were the only two numbers assigned a ranking. The respondents could choose from 1,2,3,4 or 5, but the middle three numbers were not assigned a value. Therefore, it was up to the individual respondent to determine what they meant. This could have caused a lot of error because each individual could have a different understanding of the numbers. For some people a 3 could be ranked as fair while another may rank it on the higher side of fair. Values for these middle numbers were not assigned purposefully in an attempt to see what respondents would choose. It was thought that most people would think of a 3 as important, while a 2 was slightly important and a 4 was rather important. However, with a confidential survey, it is impossible to know if that is the way all respondents interpreted the rankings.

Misleading information could also have skewed the conclusions formed in this report. There were a small number of respondents for both the faculty and the recruiter classifications. Because of these numbers, the conclusions drawn for these two groups are not fully representative of what these groups perhaps really think. This smallness was due to a few things. First, there is not a large amount of faculty for the chemical engineering department. Second, it is more difficult to track down recruiters to respond to the survey. Third, these are probably the two busiest groups who were asked to complete the survey, therefore, many people might not have had the time to answer 58 questions. Finally, these are the two groups that were not solicited to respond through email.

Although there were many possible ways to skew the data through errors associated with the survey, a number of conclusions could still be made. Most of the

errors that were associated with this survey are found in all confidential surveys that are conducted.

Appendix A: Web-based Survey

A Characteristic Study to Determine the Necessary Attributes for a Successful Chemical Engineering Student

My name is Brandy Miller and I am a senior Whittle Scholar at the University of Tennessee, Knoxville. To fulfill my scholarship requirements I must complete an original project. I have chosen to conduct a survey among five different, but related groups. My survey consists of rank ordering different skills, qualities, and activities. From the data I will be able to compare/contrast what skills, qualities, and activities each of the five groups deems most important. This information will then be used by the chemical engineering department at UT to assist in their upcoming ABET 2000 accreditation assessment. The department will then be able to focus on what improvements and changes need to be made. My faculty mentor is Dr. Charles F. Moore, department head and I am also being assisted by Nick van Goor, chemical engineering PhD candidate. If you have any comments or suggestions, please feel free to email me.

Please fill out the questionnaire below, and hit the *submit* button at the bottom of the page. Thanks!

1. Please specify which group you belong to.

Undergraduate student

2. If you are a student, please indicate your GPA.

Not applicable

3. If you are a student, please indicate how many hours a week you spend on extracurricular activities.

Not applicable

4. If you are a student, are you a Chemical Engineering major?

Yes ☐ ☐ No

How important are the following skills or qualities with respect to an "ideal" Chemical Engineering student? Please rank the relative importance from 1 to 5, where 1=*not important* and 5=*very important*.

1. Loyal to commitments	1	2	3	4	5	
Not important	☐	☐	☐	☐	☐	Very important
2. Time management skills						
Not important	☐	☐	☐	☐	☐	Very important
3. Abilities to work in teams						
Not important	☐	☐	☐	☐	☐	Very important
4. Communication skills						
Not important	☐	☐	☐	☐	☐	Very important
5. Diversified						
Not important	☐	☐	☐	☐	☐	Very important
6. Assertive						
Not important	☐	☐	☐	☐	☐	Very important
7. Attentive						
Not important	☐	☐	☐	☐	☐	Very important
8. Leadership						
Not important	☐	☐	☐	☐	☐	Very important
9. Intelligence						
Not important	☐	☐	☐	☐	☐	Very important
10. Respectful						
Not important	☐	☐	☐	☐	☐	Very important
11. Resourceful						
Not important	☐	☐	☐	☐	☐	Very important
12. Dependable						

	Not important	☐	☐	☐	☐	☐	Very important
13. Organized	Not important	☐	☐	☐	☐	☐	Very important
14. Cooperative	Not important	☐	☐	☐	☐	☐	Very important
15. Social skills	Not important	☐	☐	☐	☐	☐	Very important
16. Cultural knowledge	Not important	☐	☐	☐	☐	☐	Very important
17. Determined	Not important	☐	☐	☐	☐	☐	Very important
18. Focused	Not important	☐	☐	☐	☐	☐	Very important
19. Ability to delegate	Not important	☐	☐	☐	☐	☐	Very important
20. Intuitive	Not important	☐	☐	☐	☐	☐	Very important
21. Responsible	Not important	☐	☐	☐	☐	☐	Very important
22. Dead line orientation	Not important	☐	☐	☐	☐	☐	Very important
23. Tolerance	Not important	☐	☐	☐	☐	☐	Very important
24. Amiable	Not important	☐	☐	☐	☐	☐	Very important
25. Flexible	Not important	☐	☐	☐	☐	☐	Very important
26. Confident	Not important	☐	☐	☐	☐	☐	Very important
27. Critical thinking	Not important	☐	☐	☐	☐	☐	Very important
28. Integrity	Not important	☐	☐	☐	☐	☐	Very important
29. Patient	Not important	☐	☐	☐	☐	☐	Very important
30. Articulate	Not important	☐	☐	☐	☐	☐	Very important
31. Open minded	Not important	☐	☐	☐	☐	☐	Very important
32. Ambitious	Not important	☐	☐	☐	☐	☐	Very important
33. Analytical thinking	Not important	☐	☐	☐	☐	☐	Very important
34. Ability to follow	Not important	☐	☐	☐	☐	☐	Very important
35. Poise	Not important	☐	☐	☐	☐	☐	Very important

36. Opinionated	Not important	☐	☐	☐	☐	☐	Very important
37. Motivated	Not important	☐	☐	☐	☐	☐	Very important
38. Out-going	Not important	☐	☐	☐	☐	☐	Very important
39. Demanding	Not important	☐	☐	☐	☐	☐	Very important
40. Considerate	Not important	☐	☐	☐	☐	☐	Very important
41. Decisive	Not important	☐	☐	☐	☐	☐	Very important
42. Spontaneous	Not important	☐	☐	☐	☐	☐	Very important

How important are the following activities with respect to an "ideal" Chemical Engineering student?
Please rank the relative importance from 1 to 5, where 1=*not important* and 5=*very important*.

43. Fraternity/Sorority	1	2	3	4	5	
Not important	☐	☐	☐	☐	☐	Very important
44. Student government						
Not important	☐	☐	☐	☐	☐	Very important
45. Team sport						
Not important	☐	☐	☐	☐	☐	Very important
46. Political organization						
Not important	☐	☐	☐	☐	☐	Very important
47. Religious organization						
Not important	☐	☐	☐	☐	☐	Very important
48. Student publications						
Not important	☐	☐	☐	☐	☐	Very important
49. Community service						
Not important	☐	☐	☐	☐	☐	Very important
50. Departmental/major organization						
Not important	☐	☐	☐	☐	☐	Very important
51. Campus organization						
Not important	☐	☐	☐	☐	☐	Very important
52. Co-op						
Not important	☐	☐	☐	☐	☐	Very important
53. Internship						
Not important	☐	☐	☐	☐	☐	Very important
54. Study Abroad						
Not important	☐	☐	☐	☐	☐	Very important

Appendix B:
Survey Samples and # of Respondents

Survey Samples		
Classification	# of Respondents	% of Total Survey
Undergraduates	50	42%
Graduates	25	21%
Faculty	5	4%
Alumni	35	29%
Recruiters	5	4%

Appendix C:
GPA Rankings and Activity Hours

Undergraduate GPA Rankings		
Range	% of Total Undergraduates	# of Respondents
Not applicable	18%	9
0.00-2.00	0%	0
2.00-2.50	0%	0
2.50-3.00	14%	7
3.00-3.25	14%	7
3.25-3.50	16%	8
3.50-3.75	14%	7
3.75-4.00	24%	12

Graduate GPA Rankings		
Range	% of Total Graduates	# of Respondents
Not applicable	12%	3
0.00-2.00	0%	0
2.00-2.50	0%	0
2.50-3.00	0%	0
3.00-3.25	8%	2
3.25-3.50	8%	2
3.50-3.75	24%	6
3.75-4.00	48%	12

Undergraduate Activity Hours		
# of Hours	% of Total Undergraduates	# of Respondents
Not applicable	12%	6
0-3.0	24%	12
3.0-6.0	26%	13
6.0-9.0	16%	8
10 or more	22%	11

Graduate Activity Hours		
# of Hours	% of Total Undergraduates	# of Respondents
Not applicable	8%	2
0-3.0	16%	4
3.0-6.0	20%	5
6.0-9.0	24%	6
10 or more	32%	8

Appendix D:
Skills, Qualities, and Activities Tables
With # of Respondents

#1-Loyal to commitments						
	# of Respondents	1	2	3	4	5
Undergraduates	47	0%	0%	17%	34%	49%
Graduates	25	0%	4%	8%	28%	60%
Faculty	5	20%	20%	0%	0%	60%
Alumni	35	0%	3%	9%	51%	37%
Recruiters	5	0%	20%	0%	40%	40%

#2-Time management skills						
	# of Respondents	1	2	3	4	5
Undergraduates	47	0%	0%	6%	28%	66%
Graduates	25	0%	0%	8%	28%	64%
Faculty	5	0%	0%	0%	40%	60%
Alumni	35	0%	0%	6%	31%	63%
Recruiters	5	0%	0%	40%	40%	20%

#3-Ability to work in teams						
	# of Respondents	1	2	3	4	5
Undergraduates	47	0%	2%	6%	21%	70%
Graduates	25	0%	0%	16%	20%	64%
Faculty	5	0%	0%	20%	40%	40%
Alumni	35	0%	0%	3%	43%	54%
Recruiters	5	0%	0%	20%	40%	40%

#4-Communication skills						
	# of Respondents	1	2	3	4	5
Undergraduates	47	0%	2%	4%	34%	60%
Graduates	25	0%	0%	8%	36%	56%
Faculty	5	0%	0%	0%	20%	80%
Alumni	35	0%	0%	6%	37%	57%
Recruiters	5	0%	0%	20%	60%	20%

#5-Diversified						
	# of Respondents	1	2	3	4	5
Undergraduates	47	2%	9%	23%	43%	23%
Graduates	24	4%	8%	25%	46%	17%
Faculty	5	0%	0%	20%	80%	0%
Alumni	35	0%	6%	40%	40%	14%
Recruiters	5	0%	20%	40%	40%	0%

#6-Assertive						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	2%	30%	54%	13%
Graduates	23	4%	17%	26%	30%	22%
Faculty	5	0%	0%	60%	40%	0%
Alumni	35	0%	6%	31%	46%	17%
Recruiters	5	0%	20%	0%	80%	0%

#7-Attentive						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	0%	9%	50%	41%
Graduates	24	4%	4%	17%	21%	54%
Faculty	5	0%	0%	0%	60%	40%
Alumni	35	0%	6%	17%	40%	37%
Recruiters	5	0%	0%	40%	40%	20%

#8-Leadership						
	# of Respondents	1	2	3	4	5
Undergraduates	46	2%	4%	20%	46%	28%
Graduates	25	0%	12%	16%	44%	28%
Faculty	5	0%	20%	0%	60%	20%
Alumni	35	0%	3%	46%	31%	20%
Recruiters	5	0%	0%	20%	80%	0%

#9-Intelligence						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	2%	20%	33%	46%
Graduates	25	4%	0%	16%	32%	48%
Faculty	5	0%	0%	0%	80%	20%
Alumni	35	0%	0%	14%	46%	40%
Recruiters	5	0%	0%	0%	80%	20%

#10-Respectful						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	13%	22%	40%	24%
Graduates	25	0%	12%	24%	28%	36%
Faculty	5	0%	20%	20%	60%	0%
Alumni	35	0%	6%	31%	37%	26%
Recruiters	5	0%	0%	60%	40%	0%

#11-Resourceful						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	0%	9%	30%	61%
Graduates	25	0%	0%	8%	24%	68%
Faculty	5	0%	0%	0%	60%	40%
Alumni	35	0%	0%	6%	40%	54%
Recruiters	5	0%	0%	0%	60%	40%

#12-Dependable						
	# of Respondents	1	2	3	4	5
Undergraduates	46	2%	0%	7%	33%	59%
Graduates	25	4%	4%	8%	24%	60%
Faculty	5	0%	0%	0%	20%	80%
Alumni	35	0%	0%	9%	34%	57%
Recruiters	5	0%	0%	0%	40%	60%

#13-Organized						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	2%	16%	40%	42%
Graduates	25	0%	0%	16%	44%	40%
Faculty	5	0%	0%	20%	40%	40%
Alumni	35	0%	6%	29%	37%	29%
Recruiters	5	0%	0%	20%	40%	40%

#14-Cooperative						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	0%	13%	41%	46%
Graduates	25	0%	4%	20%	36%	40%
Faculty	5	0%	0%	40%	60%	0%
Alumni	35	0%	3%	20%	43%	34%
Recruiters	5	0%	20%	0%	20%	60%

#15-Social skills						
	# of Respondents	1	2	3	4	5
Undergraduates	46	2%	7%	26%	37%	28%
Graduates	25	12%	12%	32%	24%	20%
Faculty	5	0%	0%	60%	40%	0%
Alumni	34	0%	12%	35%	35%	18%
Recruiters	5	0%	20%	20%	60%	0%

#16-Cultural knowledge						
	# of Respondents	1	2	3	4	5
Undergraduates	46	13%	24%	37%	17%	9%
Graduates	25	28%	12%	20%	24%	16%
Faculty	5	0%	0%	80%	20%	0%
Alumni	35	6%	31%	40%	23%	0%
Recruiters	5	0%	40%	60%	0%	0%

#17-Determined						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	0%	9%	35%	57%
Graduates	25	0%	4%	12%	36%	48%
Faculty	5	0%	0%	0%	80%	20%
Alumni	35	0%	6%	11%	54%	29%
Recruiters	5	0%	0%	0%	60%	40%

#18-Focused						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	2%	7%	33%	58%
Graduates	25	0%	0%	4%	36%	60%
Faculty	5	0%	0%	0%	100%	0%
Alumni	35	0%	6%	11%	54%	29%
Recruiters	5	0%	0%	0%	60%	40%

#19-Ability to delegate						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	4%	28%	50%	17%
Graduates	25	4%	8%	24%	20%	44%
Faculty	5	0%	0%	60%	40%	0%
Alumni	35	0%	0%	43%	37%	20%
Recruiters	5	0%	0%	80%	20%	0%

#20-Intuitive						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	2%	15%	52%	30%
Graduates	24	4%	4%	13%	33%	46%
Faculty	5	0%	20%	40%	40%	0%
Alumni	35	0%	3%	26%	40%	31%
Recruiters	5	0%	20%	60%	20%	0%

#21-Responsible						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	0%	11%	24%	65%
Graduates	24	0%	0%	25%	29%	46%
Faculty	5	0%	0%	0%	40%	60%
Alumni	35	0%	0%	6%	49%	46%
Recruiters	5	0%	0%	0%	80%	20%

#22-Dead line orientation						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	4%	9%	26%	61%
Graduates	24	0%	0%	25%	50%	25%
Faculty	5	0%	0%	0%	60%	40%
Alumni	35	0%	3%	11%	57%	29%
Recruiters	5	0%	0%	20%	80%	0%

#23-Tolerance						
	# of Respondents	1	2	3	4	5
Undergraduates	47	0%	4%	32%	34%	30%
Graduates	24	4%	13%	17%	25%	42%
Faculty	5	0%	0%	60%	20%	20%
Alumni	35	0%	3%	46%	37%	14%
Recruiters	5	0%	0%	60%	40%	0%

#24-Amiable						
	# of Respondents	1	2	3	4	5
Undergraduates	47	0%	4%	32%	40%	23%
Graduates	23	4%	17%	35%	13%	30%
Faculty	5	0%	0%	80%	20%	0%
Alumni	35	3%	6%	51%	34%	6%
Recruiters	5	0%	20%	60%	20%	0%

#25-Flexible						
	# of Respondents	1	2	3	4	5
Undergraduates	47	0%	4%	28%	47%	21%
Graduates	24	4%	0%	25%	29%	42%
Faculty	5	0%	0%	40%	60%	0%
Alumni	35	0%	3%	17%	51%	29%
Recruiters	5	0%	0%	20%	40%	40%

#26-Confident						
	# of Respondents	1	2	3	4	5
Undergraduates	47	0%	0%	17%	45%	38%
Graduates	24	0%	8%	13%	38%	42%
Faculty	5	0%	0%	40%	60%	0%
Alumni	35	0%	6%	20%	51%	23%
Recruiters	5	0%	0%	20%	80%	0%

#27-Critical thinking						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	0%	4%	44%	51%
Graduates	24	0%	0%	4%	46%	50%
Faculty	5	0%	0%	0%	40%	60%
Alumni	34	0%	0%	12%	24%	65%
Recruiters	5	0%	0%	0%	60%	40%

#28-Integrity						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	2%	13%	27%	58%
Graduates	24	4%	0%	21%	25%	50%
Faculty	5	0%	0%	0%	0%	100%
Alumni	35	3%	0%	6%	29%	63%
Recruiters	5	0%	0%	0%	60%	40%

#29-Patient						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	2%	16%	60%	22%
Graduates	24	4%	8%	25%	17%	46%
Faculty	5	0%	0%	60%	40%	0%
Alumni	34	3%	12%	32%	32%	21%
Recruiters	5	0%	0%	20%	60%	20%

#30-Articulate						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	2%	31%	44%	22%
Graduates	23	4%	0%	26%	35%	35%
Faculty	5	0%	0%	20%	60%	20%
Alumni	35	0%	3%	29%	46%	23%
Recruiters	5	0%	0%	20%	60%	20%

#31-Open-minded						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	7%	20%	44%	29%
Graduates	24	0%	8%	29%	29%	33%
Faculty	5	0%	0%	20%	60%	20%
Alumni	35	3%	6%	17%	66%	9%
Recruiters	5	0%	0%	60%	40%	0%

#32-Ambitious						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	9%	24%	31%	36%
Graduates	24	4%	4%	21%	33%	38%
Faculty	5	0%	0%	80%	20%	0%
Alumni	35	6%	11%	43%	23%	17%
Recruiters	5	0%	20%	40%	40%	0%

#33-Analytical thinking						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	0%	9%	38%	53%
Graduates	24	0%	0%	0%	42%	58%
Faculty	5	0%	0%	0%	80%	20%
Alumni	35	0%	0%	6%	43%	51%
Recruiters	5	0%	0%	20%	60%	20%

#34-Ability to follow						
	# of Respondents	1	2	3	4	5
Undergraduates	44	0%	5%	25%	41%	30%
Graduates	24	8%	4%	21%	38%	29%
Faculty	5	0%	0%	60%	40%	0%
Alumni	35	0%	6%	26%	63%	6%
Recruiters	5	0%	0%	20%	60%	20%

#35-Poise						
	# of Respondents	1	2	3	4	5
Undergraduates	44	2%	7%	39%	41%	11%
Graduates	23	9%	22%	17%	26%	26%
Faculty	5	0%	20%	40%	40%	0%
Alumni	35	0%	11%	46%	40%	3%
Recruiters	5	0%	0%	60%	40%	0%

#36-Opinionated						
	# of Respondents	1	2	3	4	5
Undergraduates	45	11%	18%	31%	31%	9%
Graduates	24	21%	29%	25%	21%	4%
Faculty	5	20%	40%	40%	0%	0%
Alumni	35	14%	29%	46%	11%	0%
Recruiters	5	20%	40%	40%	0%	0%

#37-Motivated						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	0%	4%	33%	62%
Graduates	24	0%	0%	8%	38%	54%
Faculty	5	0%	0%	0%	60%	40%
Alumni	35	3%	0%	6%	43%	49%
Recruiters	5	0%	0%	20%	60%	20%

#38-Out-going						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	13%	42%	36%	9%
Graduates	24	17%	8%	38%	13%	25%
Faculty	5	0%	40%	60%	0%	0%
Alumni	35	6%	20%	43%	26%	6%
Recruiters	5	0%	20%	80%	0%	0%

#39-Demanding						
	# of Respondents	1	2	3	4	5
Undergraduates	45	11%	16%	47%	22%	4%
Graduates	24	4%	17%	29%	29%	21%
Faculty	5	20%	20%	60%	0%	0%
Alumni	35	3%	29%	63%	3%	3%
Recruiters	5	0%	20%	80%	0%	0%

#40-Considerate						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	2%	38%	38%	22%
Graduates	24	4%	17%	25%	38%	17%
Faculty	5	0%	20%	20%	60%	0%
Alumni	35	0%	9%	37%	40%	14%
Recruiters	5	0%	0%	40%	60%	0%

#41-Decisive						
	# of Respondents	1	2	3	4	5
Undergraduates	45	0%	2%	22%	51%	24%
Graduates	24	0%	8%	17%	25%	50%
Faculty	5	0%	0%	60%	40%	0%
Alumni	35	0%	3%	6%	77%	14%
Recruiters	5	0%	0%	20%	80%	0%

#42-Spontaneous						
	# of Respondents	1	2	3	4	5
Undergraduates	45	9%	29%	31%	22%	9%
Graduates	24	13%	17%	21%	25%	25%
Faculty	5	0%	40%	60%	0%	0%
Alumni	35	20%	31%	34%	11%	3%
Recruiters	5	0%	20%	80%	0%	0%

#43-Fraternity/Sorority						
	# of Respondents	1	2	3	4	5
Undergraduates	45	62%	20%	11%	7%	0%
Graduates	24	71%	4%	13%	8%	4%
Faculty	5	60%	40%	0%	0%	0%
Alumni	35	63%	20%	14%	3%	0%
Recruiters	5	80%	20%	0%	0%	0%

#44-Student government						
	# of Respondents	1	2	3	4	5
Undergraduates	44	36%	27%	16%	18%	2%
Graduates	24	50%	21%	17%	8%	4%
Faculty	5	60%	20%	20%	0%	0%
Alumni	35	34%	31%	26%	9%	0%
Recruiters	5	40%	40%	0%	0%	20%

#45-Team sports						
	# of Respondents	1	2	3	4	5
Undergraduates	45	22%	22%	27%	24%	4%
Graduates	24	25%	21%	17%	4%	33%
Faculty	5	40%	40%	20%	0%	0%
Alumni	35	34%	20%	29%	17%	0%
Recruiters	5	40%	20%	20%	20%	0%

#46-Political organization						
# of Respondents		1	2	3	4	5
Undergraduates	45	40%	27%	27%	7%	0%
Graduates	24	50%	17%	13%	13%	8%
Faculty	5	60%	20%	20%	0%	0%
Alumni	35	37%	31%	31%	0%	0%
Recruiters	5	40%	20%	20%	20%	0%

#47-Religious organization						
# of Respondents		1	2	3	4	5
Undergraduates	45	36%	22%	18%	13%	11%
Graduates	24	50%	8%	21%	13%	8%
Faculty	5	60%	20%	20%	0%	0%
Alumni	35	31%	11%	37%	14%	6%
Recruiters	5	60%	20%	20%	0%	0%

#48-Student publication						
# of Respondents		1	2	3	4	5
Undergraduates	45	33%	24%	27%	9%	7%
Graduates	24	25%	8%	4%	42%	21%
Faculty	5	60%	0%	40%	0%	0%
Alumni	35	34%	26%	23%	17%	0%
Recruiters	5	20%	60%	0%	20%	0%

#49-Community service						
# of Respondents		1	2	3	4	5
Undergraduates	46	11%	9%	37%	26%	17%
Graduates	24	17%	8%	25%	42%	8%
Faculty	5	20%	20%	20%	40%	0%
Alumni	35	11%	23%	26%	26%	14%
Recruiters	5	0%	40%	20%	40%	0%

#50-Departmental/Major organization						
# of Respondents		1	2	3	4	5
Undergraduates	46	4%	9%	11%	41%	35%
Graduates	24	13%	13%	4%	50%	21%
Faculty	5	20%	0%	20%	40%	20%
Alumni	35	0%	9%	34%	43%	14%
Recruiters	5	0%	20%	40%	20%	20%

#51-Campus organization						
	# of Respondents	1	2	3	4	5
Undergraduates	46	13%	11%	26%	28%	22%
Graduates	24	13%	21%	33%	13%	21%
Faculty	5	20%	40%	40%	0%	0%
Alumni	35	29%	17%	37%	17%	0%
Recruiters	5	0%	40%	40%	20%	0%

#52-Co-op						
	# of Respondents	1	2	3	4	5
Undergraduates	46	4%	0%	4%	24%	67%
Graduates	23	0%	0%	13%	30%	57%
Faculty	5	20%	0%	20%	20%	40%
Alumni	35	0%	3%	9%	23%	66%
Recruiters	5	0%	0%	0%	40%	60%

#53-Internship						
	# of Respondents	1	2	3	4	5
Undergraduates	46	0%	2%	13%	28%	57%
Graduates	22	0%	0%	5%	27%	68%
Faculty	5	0%	0%	40%	40%	20%
Alumni	35	0%	3%	11%	40%	46%
Recruiters	5	0%	0%	0%	80%	20%

#54-Study abroad						
	# of Respondents	1	2	3	4	5
Undergraduates	46	20%	24%	37%	13%	7%
Graduates	23	13%	9%	13%	22%	43%
Faculty	5	0%	40%	40%	20%	0%
Alumni	35	20%	29%	43%	6%	3%
Recruiters	5	20%	40%	40%	0%	0%

Appendix E:

Comments from Email

From dongre@ahab.engr.utk.edu Thu Apr 30 09:33:28 1998
Date: Mon, 27 Apr 1998 14:37:42 -0400
From: Suvrat Dongre <dongre@ahab.engr.utk.edu>
To: Brandy Natasha Miller <bmilller@utkux.utcc.utk.edu>
Subject: Re: Survey

Brandy,

I had already filled the survey before I got this email. I found the questions complete and thought-provoking. It is however not clear to me how the department proposes to use this survey. I hope you will post the results of the survey and your analysis for everyone to see at a later date.

Cheers.

Suvrat Dongre
Graduate Student in Chemical Engineering
University of Tennessee, Knoxville
(423)974-9004
<http://ahab.engr.utk.edu/~dongre>

From garcia@novell.chem.utk.edu Thu Apr 30 09:33:47 1998
Date: Mon, 27 Apr 1998 18:18:22 EST
From: "Igor Q. Garcia PD|GAG" <garcia@novell.chem.utk.edu>
To: bmilller@utkux.utcc.utk.edu
Subject: your questionnaire

Hi Brandy:

I will try to answer your questionnaire. I think you did a good job preparing it and you deserve an answer. It seems to me, however, that most of the questions are so general that whoever gets an overall "close to 5" rating can be not only a good Ch. E. student but maybe a good student anywhere else. May be the "ideal model" will be certainly close to five. But I bet that model is hard to find in the real world. You can keep the survey as it is, but I think you would extract more info if you try to particularize a little bit. Say, the domain of knowledge a Ch. E. should be specially good at like the "cluster" math/physics, computers, etc. Also, if you can put some negative "attributes" that can be still tolerated for a good Ch. E. student. I wish you success both in you project and study.

Best regards,

Igor Quinones.

From smmiller@eastman.com Thu Apr 30 09:33:56 1998
Date: Tue, 28 Apr 1998 12:03:53 -0400
From: Eastman Chemical Company <smmiller@eastman.com>
To: "'bmilller@utkux.utcc.utk.edu'" <bmilller@utkux.utcc.utk.edu>
Cc: "'smmiller@eastman.com'" <smmiller@eastman.com>
Subject: Whittle Scholar Project

Brandy,

I am a chemical engineer at Eastman Chemical Company and am alumnus of UT (received my B.S. in '87). I received the notification about your study for the UT Chemical Engineering Department and have just completed your on-line questionnaire. I think that your idea to perform such a study for your project is a wonderful idea that should lead to an interesting project and should be a service to the department.

I have a couple of quick thoughts/editorials that you may want to ponder. I'll just enumerate 'em...

1. You may disagree, but it occurs to me that there could be a difference between the characteristics of a successful student and a successful graduate (i.e. a very good employee, graduate student, etc.). I would say that there would be many common characteristics. Nevertheless, as I completed the survey, I struggled with rating a few of the skills/qualities, because I thought that they might be important for a chemical engineer in industry but not for a student, and vice versa. For example, I think that a person can be a fairly successful student (using typical measures of student success like good grades and participation in student activities) without having strong communication skills, without being dependable, and without being responsible; this is not true, I think, for a chemical engineer in industry.

I suppose that what I'm driving at is that I wonder if some of the variability that you may see in your survey will be due to differences in interpretation of "ideal student". Because this will be used by the department and because I would imagine that the department (for ABET purposes) will focus on the quality of their final product, I pretty much took the bias of "ideal graduate" as opposed to "ideal student".

2. There were several skills for which their importance is dependent upon ones focus and interest. For example, while I think having cultural knowledge/experience enriches ones life, a chemical engineer could have a long, productive, and successful career with very little cultural knowledge...You can nestle into a sheltered community like Kingsport, TN or Baytown, TX and do all kinds of great chemical engineering. You can also be devoid of knowledge of other cultures and be able to learn and do wonderfully while working with and in other cultures...that is, if you're open minded and flexible (two other qualities that your list includes).

Another example of what I mean here...I think that the ability to delegate is incredibly important to the success of someone leading a project or of someone in a position like that of your mentor, Charlie Moore. On the other hand, if you love working with the details, "bull-dogging" projects, etc., you could find a position in which you'd be enormously appreciated. I think that similar things could be said about qualities like: being outgoing, being dead-line oriented, etc.

3. About the student activities questions: On the items regarding participation in things like student fraternities, religious organizations, political organizations, team sports...Well, I wonder if you will not get variability in response here based largely on the affinity that respondents have for particular activities. For example, if I'd had a positive fraternity experience but had not been active in, say, a religious organization, I'd probably respond that it's very important to be a fraternity member and not at all important to be involved in a religious organization.

I personally think that it is beneficial to full participate in/contribute to a fraternity, a religious organization, a political organization, OR team sports. I think that much of the learning experience and benefit could be gained from participation in a single one of these to the exclusion of the others. In the end, I did not want my ratings to be interpreted in either (a) the belief that I think that participating in ALL of these activities is important, or (b) that participation in my personal favorite is much more important than the rest ...So, I must admit that I gave them all the same, rather low importance ranking.

Brandy, I hope your study goes well. Again, these are simply a few thoughts that I wanted to pass along; you might want to briefly consider them as you interpret your results.

Stephen M. Miller
Eastman Chemical Company
P.O. Box 511
Kingsport, TN 37662
423-224-7350
smmiller@eastman.com

From cfmoore@chem.engr.utk.edu Thu Apr 30 09:34:07 1998
Date: Tue, 28 Apr 1998 15:49:27 -0400
From: Charlie Moore <cfmoore@chem.engr.utk.edu>
To: Brandy Natasha Miller <bmilller@utkux.utcc.utk.edu>
Subject: Re: Survey

Brandy

Very good survey! I would like a copy of the results. It would be good feedback and very good ABET materials.

>

>My name is Brandy Miller and I am a senior in chemical engineering at the
>University of Tennessee in Knoxville. I am also a Whittle Scholar at UT.
>The Whittle Scholarship is the top scholarship an undergraduate can
>receive at UT. It is based on leadership, academics, and community
>service. It is a 5-year scholarship that includes the opportunity to
>study abroad for two semesters. As part of my scholarship requirements, I
>must create and complete a senior project. For my project, I have decided
>to conduct a survey among undergraduates, graduates, alumni, recruiters,
>and faculty to determine the qualities, skills, and activities that an
>"ideal" chemical engineering student should possess. This data will then
>be used by the UT chemical engineering department in their upcoming ABET
>2000 accreditation assessment to improve the department. Please help me
>gather information from alumni by responding to my survey. It can be
>accessed through the UTK chemical engineering department web page or
>directly at <http://pandaemonium.engr.utk.edu/whittle.html>. Thank you for
>your time! If you have any questions, comments, or suggestions, please
>email me at bmilller@utkux.utcc.utk.edu.

>

>Sincerely,

>

>Brandy Miller

Charlie Moore
Professor and Head
Department of Chemical Engineering
<http://flory.engr.utk.edu/che/che.html>

From Lennonkw@aol.com Thu Apr 30 09:34:22 1998
Date: Tue, 28 Apr 1998 19:02:19 EDT
From: Lennonkw <Lennonkw@aol.com>
To: bmilller@utkux.utcc.utk.edu
Subject: Re: Survey

Brandy:

I think your project is important for the department and the college both.
I'm terribly busy, but I'd like to participate if I can. Please furnish further data about your constraints (i.e.: survey response deadline, input format, etc.). I am excited about the potential if the department evaluates and implements needed revisions I am sure your survey will uncover.

Thanks!

Keith Lennon
Class of June '87

Appendix F:
Project Abstract

A Characteristic Study to Determine the Necessary Attributes for a Successful Chemical Engineering Student

Project Abstract

For my senior project I decided to conduct a survey among five different groups of people in order to determine what the “ideal” chemical engineer consists of. I believe that it is important to be focused on your academics, but that to be a well-rounded individual you must have certain other attributes that contribute to your person. I also believe that the most successful people, regardless of major/career, are those that have been involved in a wide range of activities and have an abundance of different skills and qualities. I set out in my project to determine if others felt this way as well.

My project consists of a survey that has 42 different attributes and skills and 12 different activities that are to be rank ordered by level of importance. There is a 5 point range from not important to very important for each of the questions. The survey is to be completed by five different, but related groups. Undergraduate students, graduate student, faculty, alumni, and recruiters have all been asked to participate. I am trying to determine if what a student feels is “ideal” is the same model a recruiter, etc. thinks of as “ideal.” I am also trying to determine if there is any truth in the saying that employers in this day want students who are well-rounded and not just academically smart.

The information that I find will not only let me know if the assumptions that I perceive to be true are correct, but it will also be used by my department. The data and results that I gather are going to be used by the department in their upcoming ABET 2000 accreditation assessment. My results are also going to be used in conjunction with a departmental survey that is now being required of graduating seniors to complete. The results of my survey will help the department know its strengths and weaknesses in regards to how well they train students to work in teams, be dead line oriented, have communication skills, and other necessary attributes. The individual group data can also be used to help the department better the students. If it is found that recruiters prefer graduates to be better able to be cooperative than assertive, then the focus can be turned to more group projects, etc. The data should help my department tailor its chemical engineering program to please all groups. Students coming in to college need to possess certain skills and qualities, but I feel that these can be fine-tuned and added to based on the curriculum that is being taught and the way in which it is taught. After all, the goal of each college and university is to produce capable graduates that can handle the rigors of everyday life and the workplace.