

## **Advanced Degrees Pursued by UMR Undergraduates**

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### Abstract

This study discusses a survey whose website link was sent to 10,000 UMR B.S. graduates since 1970 to collect information about advanced degrees received as well as interest in pursuing further education. The goal was to get a better understanding of the areas of interest in advanced degrees by engineering and science undergraduates. The primary categories of advanced degrees are engineering, science, engineering management and business administration. Information was requested to determine whether the degree choices made by those receiving advanced degrees were influenced significantly by cost, geographical locations, and/or time convenience. In addition, information was requested of those interested in pursuing an advanced degree whether they would be interested in a distance education program offering, i.e., via internet.

### Introduction

The survey requested a variety of biographical information from its participants, including degrees obtained, dates of degree completion and current professional position. Alumni were asked to provide information regarding the means by which they received their degree(s), i.e., on campus coursework or distance education. Alumni were also asked to answer questions that probed their rationale behind making certain educational decisions.

There were several goals of this survey, but the main purpose was to obtain pertinent data that will eventually help improve the advanced degree offerings at the University of Missouri-Rolla. It was deemed essential to determine the specific needs of alumni and to better understand their perceptions as to the nature of advanced degree programs in areas such as engineering, engineering management, business administration and science. Because most alumni of the University of Missouri-Rolla are engineering undergraduates, they are considered a representative audience for advanced degree programs. Also, because the University's graduate programs typically attract students who are interested in engineering and engineering management, their opinions concerning current and potential degree offerings are very useful.

Several questions were asked of alumni. First, alumni were asked to select which types of continuing education they were interested in. Second, they were asked to indicate where they preferred to attend classes. Finally, they were asked to answer a variety of additional questions aimed at pinpointing their educational wants, needs, and decision-making rationale.

## Discussion of Literature

In 1995, the National Science Foundation made several recommendations concerning the future of engineering education. The NSF felt that engineering education required comprehensive changes across the campus. Colleges and universities must take new approaches towards students, faculty and curricula [1].

The NSF also stated that the continuing education of engineers and other technical personnel was lacking a “system.” Since such a “system” was not clearly defined at that point, the NSF felt that a study was needed in order to understand its nature, requirements, and how to meet those needs [1]. The NSF recently released a study that provides complementary results to this study, shedding insight at the national level [2].

Based on 1990 U.S. census data as well as 1993 and 1995 national longitudinal surveys, Burton, Parker, and LeBold concluded that as of 1995, 2.6 million people in the United States had earned at least one engineering degree, and about 1.6 million people identified their occupation as “engineer” [3]. Additionally, they indicated that approximately 19% of people with engineering degrees also have degrees in other fields, usually business or science [3]. Since nearly one in every five people with a bachelor’s degree in engineering also has a degree in another field, it is important to assess graduate level offerings.

The intent of this survey project is to evaluate the educational needs of UMR alumni. This will hopefully provide insight into the needs of the overall engineering community. As part of this survey, alumni were asked to indicate their major considerations when choosing (or not choosing) a particular masters program. Our results were similar to those of Burton, Parker, and LeBold, who found that the major motivation for the pursuit of additional training in 1995 was to improve one’s skills. They also found that engineers are becoming increasingly involved in management tasks [3]. These particular findings reinforce the need to seek out information about working engineers.

## Methodology

A web-based interactive survey was developed and delivered to approximately 10,000 UMR B.S. graduates dating back to the 1970s. Initially, attempts were made to contact alumni by email. About 360 graduates responded. However, due to an unfortunate data acquisition problem, a significant portion of the responses were improperly recorded and, hence, not retrievable. Since only 73 responses were useful, another attempt to reach the graduates was made, this time by a postcard that included a link to the survey webpage. Responses were collected and stored in the survey database. During this attempt 269 graduates responded. Although the participation rate was quite low, it was felt that notifying alumni by postcard had advantages over email delivery. Email is subject to unavoidable flaws, such as the likelihood of outdated email addresses, the existence of spam filters, and the possibility of premature or accidental deletion by potentially willing participants. These inherent flaws complicated the dispersal process and made it quite difficult to determine how many alumni were actually reached in the first attempt.

## Data, Results and Analysis

Note: Though there were 269 respondents, some questions allowed the participant to make multiple selections or to skip particular sections. As a result, sums may not equal 269. A complete copy of the survey instrument is available from the authors upon request.

### -Educational Background of Participants

Of the 269 survey participants, 49% (131 participants) either possess a master's degree or have participated in a masters degree program at some point.

Forty-one percent of these 131 participants (54 participants) have pursued a master's degree in a different field than their bachelor's degree. The remaining 59% (77 participants) have pursued advanced degrees in the same area as their bachelor's degree.

### -Continuing Education Interest Areas

When those 137 alumni who have not yet received a master's degree or participated in a master's program were asked to evaluate their interest in various master's degrees, the 87 who indicated a strong interest were most likely to have an interest in an MBA program, rather than another degree area. (See Figure 1).

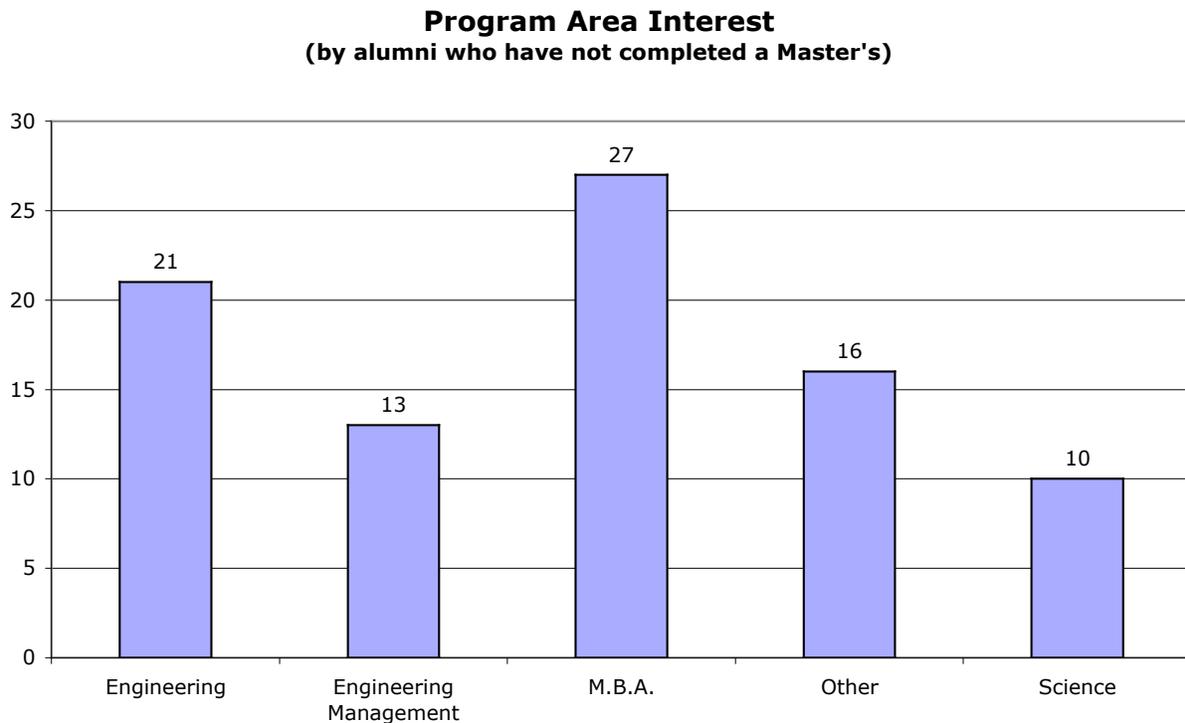


Figure 1

These results are in contrast to the areas in which the 131 alumni have completed or participated in a master's degree. Those in this category are much more likely to be involved in an Engineering master's program. (See Figure 2).

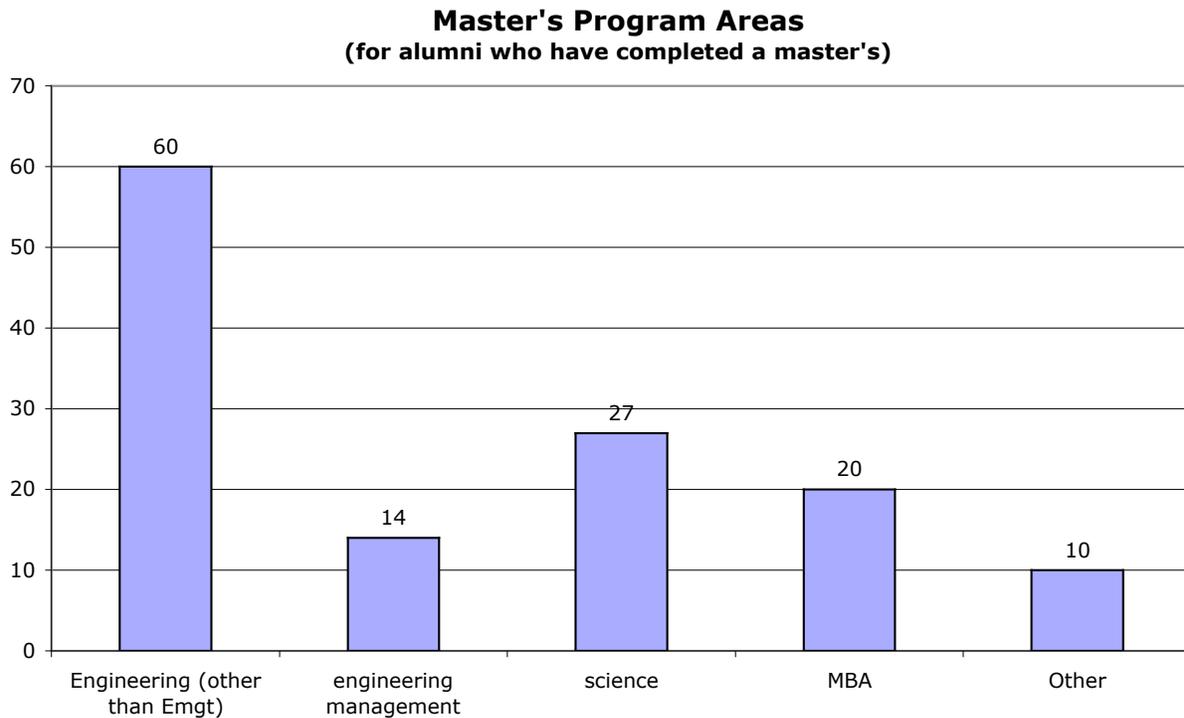


Figure 2

#### -Geographic Feasibility of Programs

The survey asked alumni who have pursued masters degrees to identify which masters-level programs were geographically feasible for them when they considered furthering their education. They were instructed to consider all of the degrees in the following list: Engineering, Engineering Management, M.B.A., Science, and None. (Since each respondent could select more than one degree the total number of responses are greater than the alumni in this category.) About 80% of the 131 participants felt that engineering masters degrees were geographically feasible for them to obtain (see Figure 3).

M.B.A.'s were considered geographically feasible for 68% of the 131 participants. Sixty-seven percent felt that an engineering management degree was geographically feasible, and 70% felt the same way about a masters degree in science.

**Number of alumni who felt that each master's was geographically feasible**  
 (these alumni have pursued a master's degree)

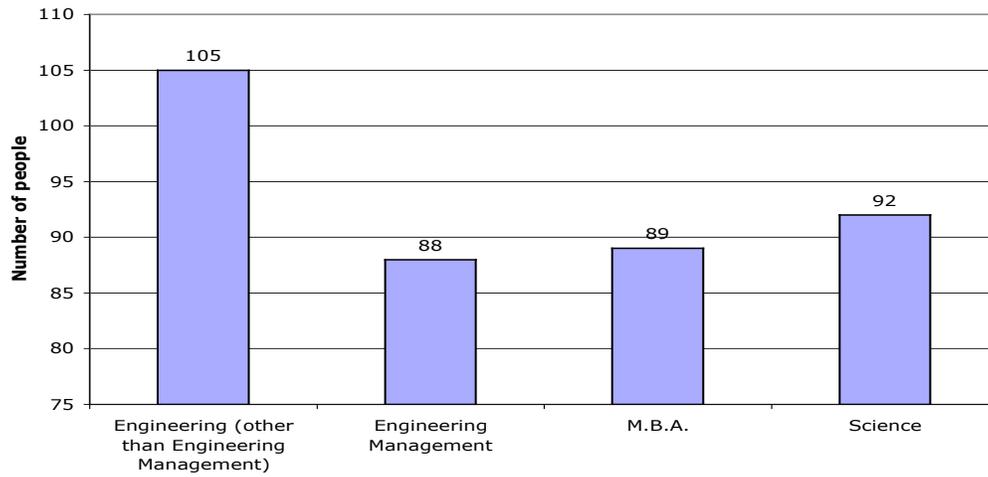


Figure 3

However, among those who have not yet pursued a master's degree, a greater percentage felt that an MBA is geographically feasible.

**Number of alumni who felt each master's was geographically feasible**  
 (those alumni who have not pursued a master's degree)

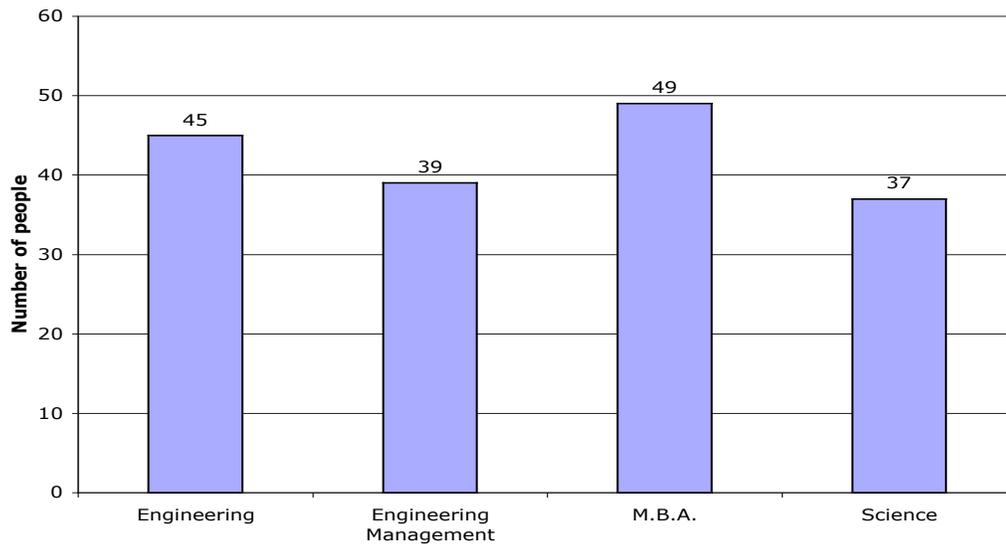


Figure 4

Each alumnus most likely defines “geographically feasible” in his own unique way, but it is apparent that a majority of the participating alumni still perceive most masters degree programs to be geographically feasible for them. Given this fact, one might hypothesize that distance learning would not necessarily be of particular interest to alumni for location-related reasons, because most alumni that have considered pursuing a masters degree consider most types of degrees geographically feasible. The survey data seems to support this notion.

#### -Program Location Preference

When the alumni were asked if they were interested in pursuing a master’s via the Internet, 73% (50 participants) of those who have not yet pursued a master’s degree but would like to do so responded positively (see Figure 5).

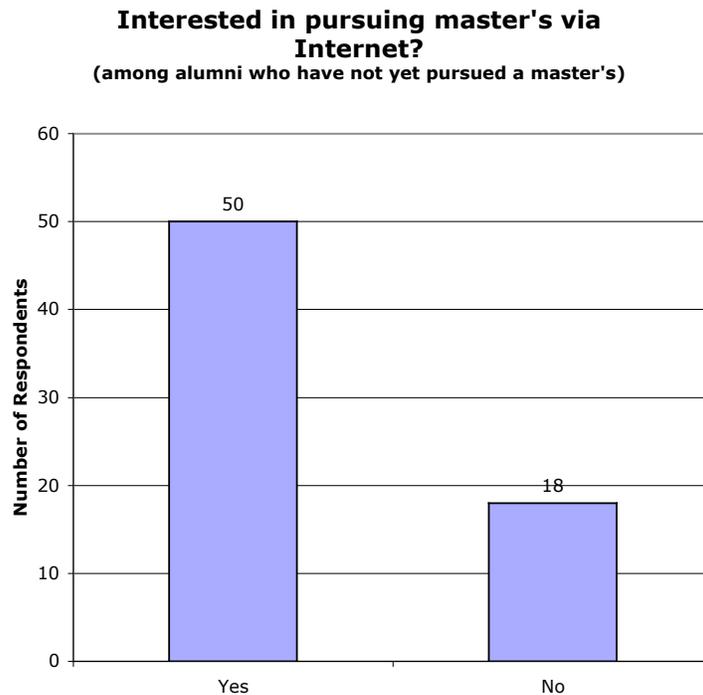


Figure 5

However, when asked where they would *prefer* to take classes, the vast majority, 86%, of those interested in pursuing a master’s, professional certification, or other education opportunity responded that they would prefer to take classes on-campus (See Figure 6).

## Class Location Preference

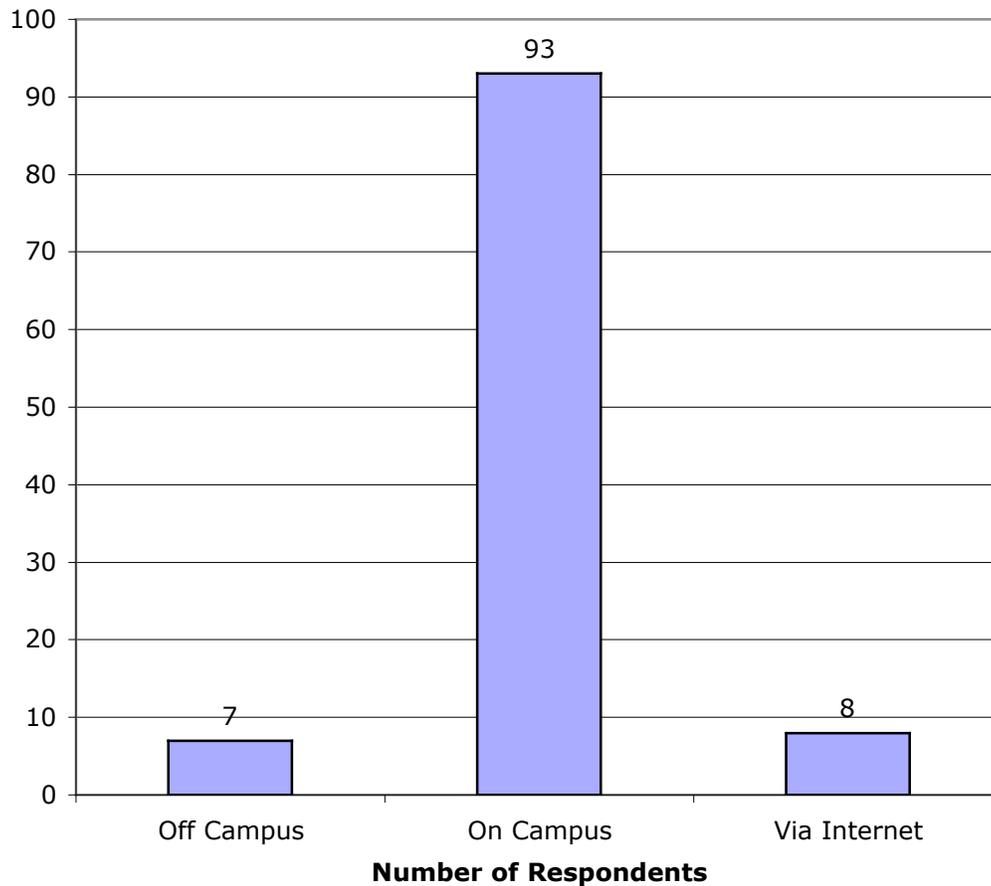


Figure 6

A definite trend can be seen with regards to alumni preference concerning location. It is quite obvious that the participants of this survey would much rather take courses on campus than anywhere else, specifically via the Internet or at a satellite location. In the future, it may be quite useful to determine whether alumni who cannot attend on campus courses would seriously consider internet-based courses when selecting a program. It would also be of particular interest to determine if an internet-based program at one's top choice school would be chosen over an on campus program at a second or third choice school if the option were available. A future survey might pose the question "If you rejected an on campus masters program solely based on the location of the school, might you have reconsidered the school if the same masters program were offered via the internet?"

### -Importance of Considerations in the Educational Decision Making Process

Alumni were asked to evaluate their motivation to achieving a master's degree. It was found that for alumni that either possess a masters degree or have pursued a masters degree in the past, the

consideration “enhance skill background” was the most heavily weighted factor (see Figure 7) with 78 alumni out of 131 evaluating it as “very important”. Personal Growth was also important to the respondents, with 69 out of 131 respondents evaluating it as “very important”.

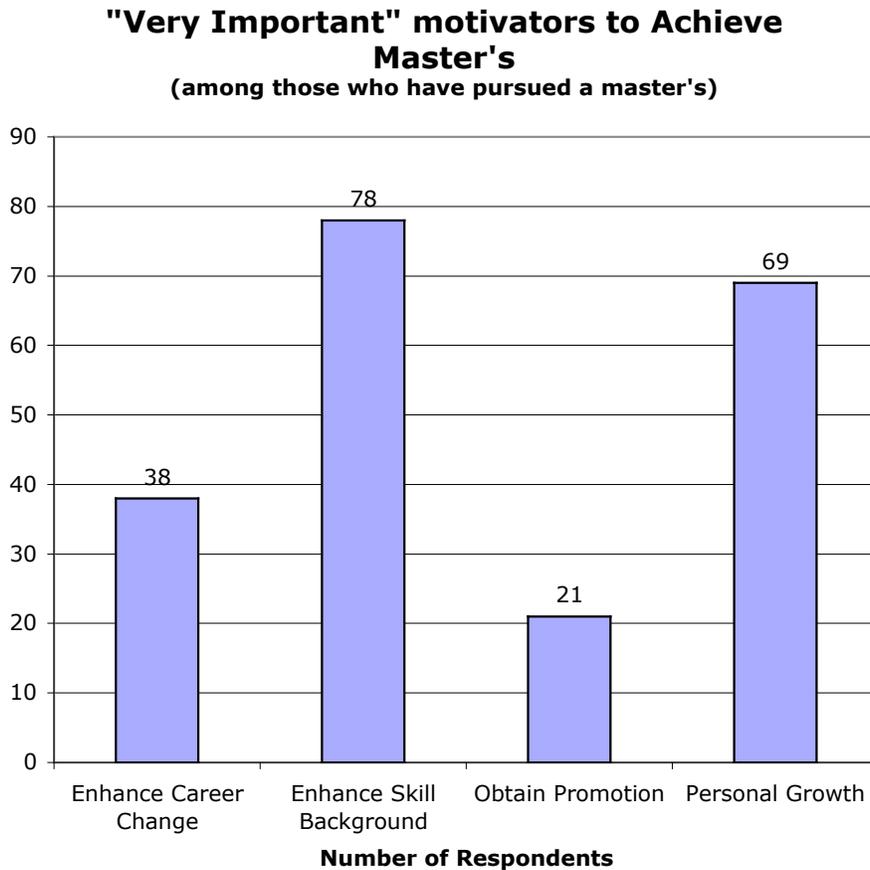


Figure 7

When those who have not yet pursued a master’s but were interested in doing so (a total of 76 respondents) were asked the same question, “Personal Growth” was considered very important by more respondents, though it was closely followed by “Personal Growth”. (See Figure 8).

**"Very Important" motivators to Achieve  
Master's**  
(among those who have not pursued a master's but are  
interested)

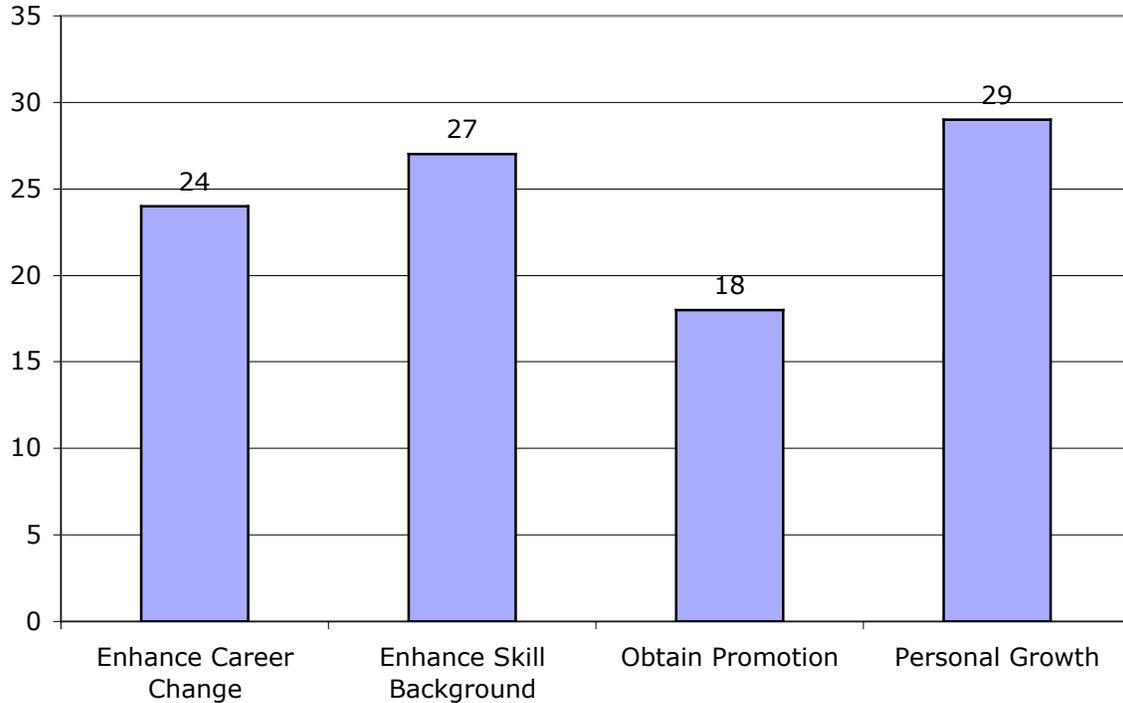


Figure 8.

-Factors in choosing a master's program

Finally, reasons for choosing a particular Master's program were investigated. For both alumni who have and have not pursued a master's program, convenience of location and schedule weighed heavily in making the choice about which program to pursue. (See Figures 9 and 10). However, for those who have already pursued a Master's degree, the prestige of the program was evaluated as relatively more important than for those who had not yet pursued a Master's.

**Number of participants that ranked each consideration "Most Important"**  
 (Answered by alumni who possess or have worked on a Masters)

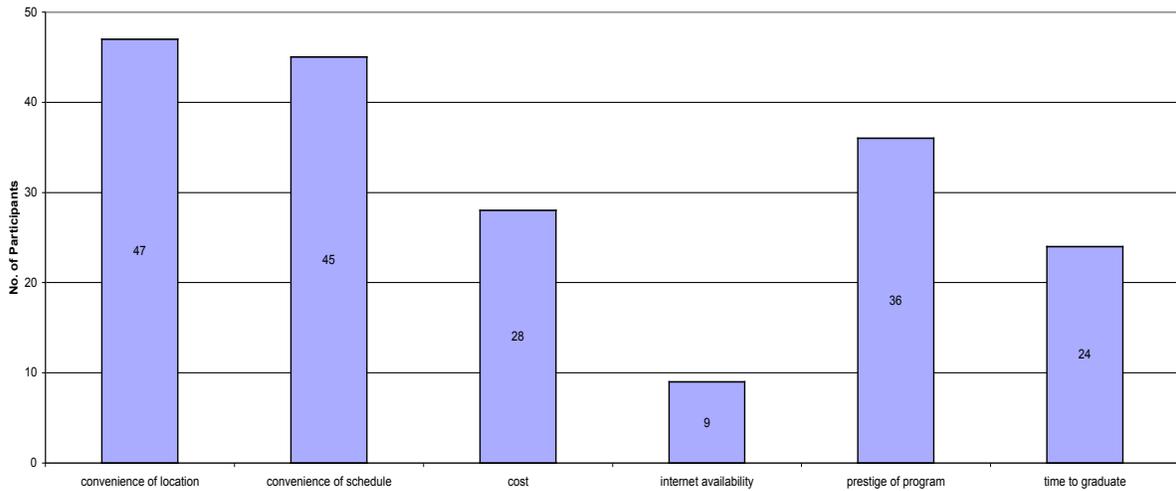


Figure 9

**Number of participants that ranked each consideration "Most Important"**  
 (answered by who have not yet pursued a master's but are interested in doing so)

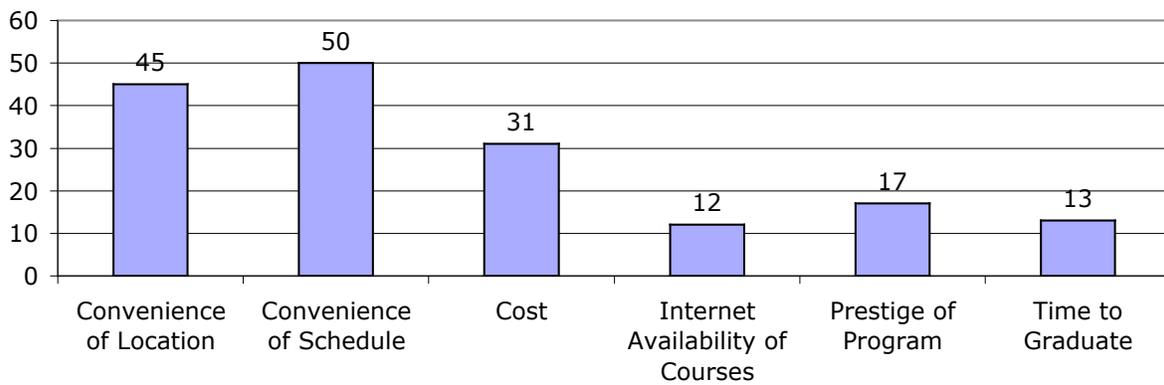


Figure 10

## Conclusions

Although the participation in this survey was quite low, there were several findings that certainly warrant more investigation. Personal growth and enhancing skill background was generally a very important factor for many alumni, regardless of the extent of their educational background. Convenience of location and schedule was also important to many alumni, and there was a general trend in the desire for on campus programs rather than satellite or internet-based programs. Even though individuals professed interest in pursuing a master's over the Internet, a large portion of the alumni felt that Internet availability was of low importance. This is of particular interest based on the conclusion that convenience of location is such an important characteristic for many alumni. The connotation of the word "convenience" should be probed further in the future. Determining the reasons for low interest in internet-based learning would be a desirable outcome of further survey trials.

- 1) National Science Foundation (U.S.). Directorate for Education and Human Resources. *Restructuring Engineering Education: A Focus on Change, Report of an NSF Workshop on Engineering Education, National Science Foundation*. June 6-9, 1995.
- 2) The Education and Employment of Engineering Graduates. 2004. Engineering Workforce Project Report #1. Cambridge, MA: ABT Associates Inc.
- 3) Burton, Lawrence, Linda Parker, and William LeBold. *U.S. Engineering Career Trends*. AEEE Prism. 1998.

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