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Abstract

Over the last several decades, the graduate programs in North America have included a large percentage of international students. A majority of the students, particularly in engineering, originate from India and China. These two countries have seen considerable growth in technology and engineering education in recent years. The changing socio-economic global scenario, strict immigration policies, and other challenges faced by international students in the United States have influenced the recruitment and retention of the best and brightest international graduate students into domestic programs. By working to understand the globally changing environment, challenges faced by international students can be better understood and mitigated, helping to provide an educated workforce to meet the growing demand for engineers in the U.S.

In this present work, a survey was conducted to evaluate the various challenges faced by international students from many institutions across the country. The survey results presented here focused on major concerns and a student’s criterion to decide about graduate school. Responses based on nationality and genders are described.

Introduction

Interests in international student education have increased in the past couple of decades for a number of reasons. Most of the countries are recognizing the need of global consciousness in order for them to compete in the global education and economy. At present, about 2 million students worldwide study outside of their home countries with the U.S. being the leading country to enroll most of the international students.

In a survey conducted jointly by the American Council on Education (ACE), the Association of American Universities (AAU), the Council of Graduate Schools (CGS), NAFSA: Association of International Educators, and the National Association of State Universities and Land-Grant Colleges (NASULGC), around 250 institutions provided data regarding graduate applications from international students. Nearly half (47%) indicated a decline in applications, 38% thought application rates had not changed, and 14% indicated an increase in application numbers. All of these respondents indicated declines in international graduate applications.

In 2007, a survey was carried out by the Institute of International Education (IIE) in cooperation with American Association of Community Colleges (AACC), American Association of State Colleges and Universities (AASCU), American Council on Education (ACE), Association of American Universities (AAU), Council of Graduate Schools (CGS), NAFSA: Association of International Educators, and National Association of State Universities and Land-Grant Colleges (NASULGC). Totally, 700 institutions responded to the survey. The results indicate that new enrollments at most of the U.S. institutions seem to be increasing, with respondents reporting more increases than declines (although growth rate has declined). Twenty-two percent of the responding institutions experiencing declines in international student enrollments cited rigorous visa application processes and concerns over delays/denials as the major reason for the decline, followed by cost of tuition/fees at U.S. institutions and decisions to enroll in institutions within another country. Several educators believe the declines reflect a combination of several factors,
including competition for international students among U.S. institutions, lack of financial aid or scholarships for international students, and potential students' negative perceptions of the visa and entry process.

This perception is supported by data. The number of I-20’s issued by the U.S. State Department to potential international students in fall 2002 decreased by 3% compared with fall 2001, while visa denials rose by 0.7% in fall 2002 compared to fall 2001. This perception is supported by the data, which clearly shows the stricter and rigorous visa regulations post September 11.

N. P. Sharma provided a valuable insight into the cause of the phenomena of declining graduate student applications and admissions in U.S. universities. In his article, he pointed out three main causes as the driving force for the declining quality of international graduate students (a) A more strict visa process and regulations aftermath of September 11, 2001, (b) A keen competition for high quality international graduate students from all major universities and institutions of higher learning in the developed nations (US, UK, Canada, Australia, Germany, France, Russia, and other countries) (c) Tremendous growth of economy, industry, information technology and other technologies, and facilities for world class quality graduate education in developing countries led by India and China. This keeps their native science and engineering graduates well employed at home.

In the recent news article published in The New York Times, the scientists argue that visa trouble would drive foreign students away. This is a serious issue as American universities rely on foreign students to fill slots in graduate and postdoctoral engineering programs. These visa issues occur when the students leave U.S. for family visits or conferences abroad and then they find out that they need a new visa to return.

Some authors, summarized challenges faced by international students at different phases of graduate studies and argued the need of policy development to increase the enrollment of international students. Another survey based study dealt with the expectations and experiences of international graduate students, especially Indian students at University of Bridgeport. Faculty perspectives related to international student’s needs and educational systems have been well addressed by authors in the past. Views of faculty members for graduate international students were presented well by A. G. Trice. Faculty members varied in the extent to which they perceived that international and domestic students had distinct academic and personal needs.

Authors have presented a typical global model in the past to increase the enrollment of minority and international graduate students. They suggested that the department should develop videos on faculty development to educate faculty for active participation in recruitment and retention efforts. As reported in literature, several universities have taken special steps to ensure that the number of international students on their campuses does not decline. These steps included new international programs or collaborations, followed by new staff or additional staff time devoted to international recruitment, recruitment offices located outside the U.S., and new funding for international recruitment trips and for marketing and promotion of programs.
There is a need for coordinated efforts to get the best quality international students by understanding the international student’s preferences to choose the school, the challenges and problems faced by them at different phases of graduate school. This paper is based on an online survey conducted to evaluate the various challenges faced by international students from many institutions across the country. Results presented here relate to major concerns as well as preferences, which are based on responses from 487 international engineering graduate students/alumni (117 female and 363 male and 7 not declared). Responses based on nationality, and gender were analyzed and are discussed here.

In the next sections, contributions of the international students to graduate school, a summary of the survey results related to common concerns for prospective students and student’s preference in deciding the school to attend will be discussed in detail. The last two sections are aimed at providing results based on overall experiences of students and summaries of the survey results and findings.

**Contributions of international students to engineering graduate school**

International students bring a variety of benefits to the school including filling research assistant vacancies, helping establish international ties, and globalizing perspectives providing American students with a more accurate perception of their life circumstances\(^{10}\). Cultural and gender diversity among students in academic institutions and among employees in the corporate world brings different perspectives to the academic and corporate environment and substantially help with growth. International students contributed around $12.87 billion in the academic year 2003-2004\(^{12}\). These contributions included tuition, fees paid including expenditures on travel, food, housing, incidentals, and the cost of supporting a family by all type of students. In return, international students get better research quality, global exposure, diversity and an excellent education\(^{13, 14}\). Several former Fulbright grantees and international alumni also benefit the U.S. economic system and universities. Many are political and economic leaders in their home countries, with fond memories of U.S. and their Alma maters\(^{12, 15}\).

**Common concerns for prospective students**

International students have several concerns before applying/attending the school. In the survey conducted via online, they were asked to rank a list of eleven most common concerns with 1 as the greatest concern and 11 as little or no concern. These common concerns are listed below:

1. Transcript evaluation
2. Meeting the deadlines for admission
3. Getting VISA
4. Being accepted into the program
5. Housing
6. Language and culture change
7. Funding/ Support
8. Finding a good academic advisor
9. Finding good courses
10. Finding job after graduation
11. Safety and security of the Campus

Ranking data obtained by all respondents were averaged and inverted by subtracting from 11 (lowest rank possible) to find the composite average rank. Same process was conducted for ranking by female student respondents and male student respondents. As shown in figure 1, the top 5 concerns were:

1. Funding/ Support (composite rank of 7.76)
2. Being accepted into the program (composite rank of 7.47)
3. Getting VISA (composite rank of 7.76)
4. Finding a good academic advisor (composite rank of 6.64)
5. Finding job after graduation (composite rank of 6.05)

![Figure 1: Average of ranking for concerns before attending school by all respondents/female/male](image)

As shown in figure 1, the overall top five concerns for female and male students were the same as for overall. There are some differences in priority of concerns level after top five concerns. Female students considered safety and security very important with high rank averages compared to male.

Ranking data for influence obtained by all respondents were averaged and inverted by subtracting from 10 (lowest rank possible) to find the composite average rank. Figure 2 shows some interesting results about concerns by nationality. The top five concerns were different for students from Asia, America (North and South America not including USA) and others (Europe, Australia, Middle Eastern countries and others).

It was interesting to note from figure 2 that concerns were varied by nationality. Receiving financial support was the primary concern for Asians, while getting VISA was the
main concern for students from Middle East and other countries. Students from North America (other than USA), South America and Europe were most concerned about getting accepted into program and also finding financial support.

**Fig 2: Average of ranking for concerns before attending school by Nationality**

**Recruiting effort by US Universities and student’s preferences**

Attracting the best quality international students has been recognized as important by many universities and some are quite active in recruiting efforts. This could be achieved, if it is combined with student’s perspective on what are the important priorities they consider when they decide to apply or seek admission for a particular school. In our survey, all participants were asked to rank the list based on which influenced most in their decision to apply to a particular university with 1 as greatest influence and 10 as little or no influence. Below were the options given to them:

1. University recruitment effort
2. Correspondence with graduate school/professors before arrival
3. Funding opportunities
4. Ranking of the school
5. International student population
6. Location of university
7. Quality of faculty members
8. Employment prospects after graduation
9. Overall expenses
10. Having friends or someone you knew

Based on figure 3, funding opportunities were ranked as a major influence by respondents. There were other major concerns, which influenced the student’s decision to decide about school. The top six concerns are listed here:
1. Funding opportunities
2. Ranking of the school
3. Quality of faculty members
4. Overall expenses
5. Employment prospects after graduation
6. Correspondence with graduate school/professors before arrival

![Bar chart showing average ranking for influence to choose school by all participants/female/male.](image)

**Fig 3:** Average of ranking for influence to choose school by all participants/female/male

It is important to note that correspondence with school/professors was also ranked very high other than obvious criterion of ranking, overall expenses and employment prospect. This is an immediate area where individual faculty can influence graduate student recruitment into their programs.

It is interesting to note from figure 3 that influencing factors for choosing school for females were different from males after top three influences. Female students top six influences to choose a school were:
1. Funding opportunities
2. Ranking of the school
3. Quality of faculty members
4. Correspondence with graduate school/professors before arrival
5. Employment prospects after graduation
6. Overall expenses

Male students top six influence to choose a particular school were:
1. Funding opportunities
2. Ranking of the school
3. Quality of faculty members
4. Overall expenses
5. Employment prospects after graduation
6. Correspondence with graduate school/professors before arrival

**Fig 4:** Average of ranking for influence to choose school by nationality

Figure 4 shows that students from Asia were influenced by the same criterion as shown by overall responses. It is interesting to note that ‘having friends or someone they know’ was a top five influential factor for Europeans and American students. It is also worth noting that students from other countries, Europe and America were strongly influenced by correspondence with professors and school.

**Overall experience with U.S. education system**

All the respondents in the survey were asked to choose their overall experience with education system in USA with following choices:
1. Very Easy
2. Easy
3. Neutral
4. Difficult
5. Very Difficult

From figure 5, most of the respondents found overall education system in U.S. to be easy. There is not a huge difference observed between easy and neutral opinions of the respondents. There is a slight skewing to the easier end of the spectrum.
Summary

Faculty and students have anecdotal evidence of trends related to participation of international students in graduate education in the U.S. By doing a scientific survey of international students across the U.S., the authors have started the process of documenting the trends and issues to help facilitate discussions about opportunities for improving processes. This paper provides some initial results of the survey including breaking down some of the responses based on the region from which the student has come as well as gender of the student.

These results will serve to a) investigate and compile common problems, b) educate incoming and existing students and faculty of these challenges, and c) provide guidance on dealing with these challenges. This paper is based on the partial results compiled and focuses on certain important aspects like common concerns of graduate international students, recruiting efforts of U.S. universities and student’s priorities, and overall experience of education system in U.S. Responses were discussed based on nationality and gender of the respondent.

The overall five major concerns for a student in selecting a school were funding/Support, being accepted into the program, getting VISA, finding a good academic advisor and finding job after graduation. The primary concern, which influenced a student to apply to particular school, was funding opportunities. The respondents also found that the overall education system in U.S. was easy and not much difference was observed between easy and neutral responses. A more comprehensive reporting of the survey results will be available in the near future.

Bibliography