

Session No. #

**Investigating Diversity: A Study of One Institution's  
Main and Extended Campus Undergraduate Engineering Programs**

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Abstract

An exploratory study investigating diversity in engineering programs at both a main campus and an extended campus recently has been conducted. The purpose was to detect what, if any, differences exist based on key demographic, institutional and student perception data. Institutional research data were collected from a variety of sources and survey techniques.

The study found the main campus, located in a primarily urban area, did not fare much better in terms of diversity than the extended campus, which is located in a primarily rural area. Results also suggest students at the extended campus are generally older, non-traditional students and 79% of them are employed (to varying degrees). At the main campus, students were largely traditional and 61% of those students were employed. With regard to hours employed, students at the extended campus generally worked considerably more hours outside the classroom than students at the main campus. Also, about half the students at the extended campus had attended a community college prior to enrollment in the four-year program, almost twice that of students who attend the main campus. Students at the main campus were significantly more likely to have a parent with at least a bachelor's degree. Interestingly, students at the extended campus averaged one point higher on the ACT than students at the main campus. In comparing GPAs however, students at the main campus had a 0.4 higher GPA than those at the extended campus.

Student perception data revealed students at the extended campus believed their campus was more concerned, more respectful, and a less competitive environment than students at the main campus. An alarming finding of this study was students' belief that their campuses grew more racially intolerant as they progressed from freshmen year to senior year. Data also revealed students who had previously attended a community college were more knowledgeable of, and respectful to, other cultures.

## Introduction and Background

Higher education has witnessed many changes throughout its history. One of the most recent is the issue of diversity. Recently, diversity has moved to the fore for many institutions as not only a goal, but as a mandate. Administrators and faculty look for new ways to increase diversity for all groups on campus. Some programs provide more challenges than others. Engineering programs typically encompass a greater number of white males than any other program, and the University of Kentucky (UK) College of Engineering is no exception. In 2004, the percentage of women enrolled in undergraduate engineering at UK was approximately 13 percent, while students of different ethnic groups comprised approximately 10 percent of the same group<sup>1</sup>. The trend nationally did not present a much brighter finding, as “women represented only 20% of the total undergraduate enrollment in engineering programs [in 1999]”<sup>2</sup>. Matters are even worse a half-decade later, for in fall 2005, only 17.5 percent of enrolled engineering undergraduates were women and the percentage of women receiving bachelor's degrees has slowly declined from 21.2 percent in 1999 to 19.5 percent in 2004-05. (<http://www.asee.org/colleges>)<sup>3</sup>. In light of these statistics, the researchers are particularly interested in how extended campus engineering programs fare in terms of diversity as well. To do this, we compared institutional research data between home campuses and extended/branch campuses to detect similarities and differences between the programs. The researchers also surveyed students at both campus types to gain insights regarding their perceptions of diversity. It is through this triangulation that perceptions of diversity at home and extended campuses can be better understood, so as to arrive at more appropriate institutional decisions and policies.

## Institutions Included in Study

The University of Kentucky (UK) is a public land-grant, research extensive university located in central Kentucky. In fall 2006, UK's enrollment was 27,209 students. As the state's flagship university, UK has often been sought to help create and manage new programs throughout the state. UK's extended campus program located in Paducah, Kentucky, some 400 km west of the main Lexington campus offers Bachelor of Science degrees in both Chemical and Mechanical Engineering, and (as enrollment permits) a Master of Science degree in Mechanical Engineering.

## Definition of Extended/Branch Campuses

The term “extended campus” generally refers to any place of learning other than the institution's main campus. The term is also used to refer to distance education, as it relates to both physical and virtual locations. The term “branch campus” is defined by the U.S. Department of Education<sup>4</sup> as:

A location of an institution that is geographically apart and independent of the main campus of the institution. The Secretary considers a location of an institution to be independent of the main campus if the location is 1) permanent in nature; 2) offers courses in educational programs leading to a degree, certificate, or other recognized educational credential; 3) has its own faculty and administrative or supervisory organization; and 4) has its own budgetary and hiring authority.

Because of its distance education connotation, extended campuses are sometimes considered distinct from that of branch campuses. For this research, the terms “extended campus” and “branch campus” will be used synonymously to refer to the cooperating institutions.

## Methods

This research incorporated multiple methods of data collection. For demographic and home campus data, the researchers employed institutional research data. Data pertaining to the extended campus were provided by the site-director at the cooperating campus. In addition to capturing traditional institutional research data (demographics, counts, etc.), the research team created and administered a survey to capture students’ perceptions of diversity at both the home and extended campus.

After approval from UK’s Institutional Review Board (IRB), the survey was administered to students enrolled in both Mechanical and Chemical Engineering courses at the UK-Paducah campus and students enrolled in Mechanical Engineering courses at UK’s main campus. A total of 43 students at UK-Paducah and 21 at UK’s main campus were surveyed. The survey instrument asked students to select their level of agreement with 47 questions, using three-, four-, and five-point Likert-type and five-point semantic differential scales. Ten additional demographic questions were included to gain a better understanding of the composition of students participating in the survey. One open-ended response question allowed students to expand on previous answers and to offer otherwise unsolicited information. The statistical program, Minitab (version 14), was used for data analysis, which included calculating descriptive statistics, specifically means and standard deviations, along with counts and percents; correlation estimates; and t-tests. Reliability estimates were produced via an SPSS 12.0 analysis. All missing data were treated as “missing.”

## Results and Conclusions

In order to establish a local context for each of the regional and main campuses and the potential population from which to draw a diverse engineering study body, the researchers looked at various population characteristics of the county in which the campus was situated and the surrounding adjacent counties. The contextual data collected (see Appendix A) included: Number/percent of the population from urban and rural areas (as part of a regional campus’ mission is to take educational opportunities to students from small, more remote communities who lack physical access to the main campus); race for the population 18 years and older (to view the potential college enrollment “pool” of racial minorities from these areas); the overall percent of population enrolled in college by race; the overall percent of college enrolled by gender; and the undergraduate engineering program enrollments for the two UK campuses. Appendix B details nationwide undergraduate engineering bachelor’s degree attainment data. The emergent trends are as follows:

The minority population composition of each the UK/Paducah and UK/Lexington campuses and surrounding counties are as follows: Alaskan Native/American Indian (0.22%) and

(0.21%), Asian (0.29%) and (1.61%), and Native Hawaiian/Pacific Islander (0.02%) and (0.03%). The percentage of African-American population for each of these campuses is 5.15% and 8.86%, respectively. While UK/Lexington's African American population is only 3.71% higher than UK/Paducah (or 1.72 times), the Asian population is over five times that of UK/Paducah. There are little or no distinguishable differences for the other races (Appendix A).

The African American college enrollment rate at UK/Lexington was 8.00%, whereas UK/Paducah was 6.90%. The percent race of population versus race of college enrolled indicates some definite trends among the populations of White, African-American, Native Hawaiian/Pacific Islander, and Other. However, UK/Lexington's Asian college enrolled rate is three times (3.40%) than of the percentage of the general Asian population (1.61%). On the other hand, this rate is relatively stable on the UK/Paducah campus (0.29% versus 0.17%). The ratio of American Native/American Indian at UK/Paducah (0.47%) is more than two times that of UK/Lexington (0.22%) (Appendix A).

UK/Paducah is predominantly rural (59.17% versus 31.14% urban). UK/Lexington is predominantly urban (81.86% versus 19.14%). While UK/Lexington has about two and a half times the urban population (50.72% more), this degree of urban composition was not found to be an indicator of the diversity of the population. While no apparent link or trend exists between urban population rate and African-American college enrollment, there does appear to be a connection related to Asians: the Asian college enrollment rate of urban UK/Lexington is 20 times that of rural UK/Paducah.

#### Overall Population Characteristics Compared to Engineering Enrollment

The data definitely supports a lack of diversity in gender for enrollments in engineering versus the overall college enrollment rate.

- The national percentage of females awarded Bachelors degrees is 57.38%, whereas in the engineering field that percentage is roughly 20.11% (Appendix B).
- The overall female college undergraduate enrollment rate at UK/Paducah is 55.90% and at UK/Lexington is 53.98%; the female enrollment rate for UK/Paducah's engineering programs is 11.63% and UK's engineering program is 14.27% (Appendix A).

#### Student Composition and Characteristics (from Survey)

The student composition at both UK and UK-Paducah appeared to be considerably different with regards to age. Although the mean student age for both campuses were very similar, this is likely due to survey sampling. What is important to note, however, is 33% of students at UK-Paducah were 25 years old or older, compared to only 5% at UK. Because the UK-Paducah sample contained entirely undergraduates and the UK sample consisted of 90% undergraduates, we can infer there is a significant age difference between students at the two campus types, as the extended campus tends to draw a larger proportion of older (non-traditional) students into its undergraduate programs. See Appendix C for all information regarding students' characteristics.

With regards to gender, 24% of respondents at UK were female. Only 12% of the UK-Paducah sample was female. When looking at overall college data, this is somewhat misleading as UK has enrollments of 14.27% female, while UK-Paducah averages 12% female students. Overall, there is little difference in terms of gender diversity at both campuses.

Survey data reveal only 14.3% of students participating in the survey were of minority status at UK and 9.3% at UK-Paducah. Analysis of college-wide data reveal very different data, as approximately 11% of students at UK are of minority status compared to only 2.11% of students at UK-Paducah. With regards to student diversity, data suggest the urban campus attracts more minority students than the rural campus.

Counts and percents of students' class were tabulated as well. Data reveal approximately 91% of students at UK responding to the survey were seniors. The remaining 9% were graduate students. At UK-Paducah, approximately 47% were seniors, 28% juniors, 21% freshmen, and 4.7% sophomore.

With regards to the size of students' hometowns, 47.6% of UK students were from urban areas and the same percentage was from rural areas. Because the definition of urban and rural is somewhat broad and open to interpretation, 4.8% of students reported residing in a community that was a combination of both. At UK-Paducah, only 14% reported living in a city, and 83.5% in a rural area. A small number (2.3%) reported residing in a combination of both. The data suggests the rural extended campus serves its purpose of providing an education to primarily rural students.

Data from both campuses were very different in terms of students' distance from campus. Nearly 86% of respondents at UK reported living between 0-10 miles from campus. At UK-Paducah, roughly 35% reported living this close to campus. Approximately 17% reported living 11-20 miles away, 42% living 21-50 miles away, and 7% living over 51 miles away from campus. Upon reflection of the wording for this particular survey item, it is possible students at UK reported their current living distances, as most live in university housing, dorms, or local apartments. Because of this potential confusion, the authors believe one should not speculate a great deal with regards to comparing students at the two campuses. However, we believe the UK-Paducah data is relatively generalizable for the entire UK-Paducah student body.

Another survey item asked respondents to report any previous college types they had attended prior to their current status. Data revealed nearly twice as many students at UK (57.1%) had not previously attended another institution, as opposed to students at UK-Paducah (30.2%). Interestingly, approximately 47% of students at UK-Paducah had attended a community college previously, compared to only 19% of UK students. Almost 24% of students at UK's campus also reported attending another four-year institution at some point. Only 12% of students at UK-Paducah had previously attended another four-year institution. These findings reveal a great deal of information about both programs. Because UK is a state university, it is more likely to attract students as they initially enter college. Generally speaking, students in rural areas often attend community colleges due to the benefits of living at home (e.g. costs saving) while completing degrees. Also, because UK-Paducah shares a physical campus with Western Kentucky Community & Technical College, the rather large number of transfer students comes as no

surprise. In fact, it is likely that some students in the Paducah cohort did not even acknowledge having attended a community college previously, since great effort has been expended to administer the programs in Paducah as “UK programs,” with UK serving as the home institution in terms of maintaining student records and handling financial aid.

Another survey item asked respondents to rate the education level of their most educated parent. Data revealed some rather interesting findings. About 28% of students at UK-Paducah rated some high school or high school graduate as the highest education obtained. The response at UK was half that. Nearly 26% of students at UK-Paducah reported a parent had attended some college, but only 18.9% had completed an undergraduate degree. At UK, 9.5% of students reported a parent having attended college, while 33.3% reported at least one parent earning a college degree. Also, 42.9% of students at UK reported at least one parent held a graduate degree. Approximately 28% reported the same at UK-Paducah. These findings are interesting because students at UK appear to have a slight socioeconomic advantage over those at UK-Paducah. The nature of urban and rural environments may also account for some of this variance as well. This phenomenon is certainly worthy of further investigation.

Students at UK appear to work considerably less with regards to employment than students at UK-Paducah as well. At UK, 38.1% of students reported not working at all, 42.9% worked 1-20 hours, 14.3% worked 20-30 hours and 4.8% worked 31+ hours per week. At UK-Paducah, only 21% of respondents reported not working at all. 34.9% worked 1-20 hours, 23.3% worked 20-30 hours and a large 20.9% worked 31 or more hours per week. This is somewhat expected as students who attend and reside on campus at an institution would work primarily 20 or less hours per week. However, 44.2% of students at UK-Paducah work 20 or more hours a week. This further correlates with more of the older, non-traditional students attending UK-Paducah.

#### Students' Academic and Financial Aid Status

Although a great deal of data was unattainable for the purpose of the following comparisons, some discussion should still occur. Perhaps the most important finding was mean ACT scores. Students at UK-Paducah actually had an entire point higher score on average than the University average. It is assumed with UK being the state university the mean age would be somewhat lower than its extended campus program. It is also logical to assume students at UK-Paducah may have lower percentage scores for students who are Pell Eligible, as more students at the extended campus are non-traditional and employed full-time. Based on actual and expected data, it appears the quality of students at extended campuses may be at least as good as students at the main campus, at least in terms of ACT scores. With regards to GPA, however, there is considerable difference, as UK-Paducah is nearly 0.4 points less than students at UK. With regards to socioeconomic status, it is impossible to draw any conclusions without additional data.

Table 1: Summary of Engineering Student Characteristics

<b>Campus</b>	<b>Mean ACT</b>	<b>Mean Age</b>	<b>Mean GPA</b>	<b>Age Range</b>	<b>% Pell Eligible</b>	<b>% Student Loans</b>
UK/Paducah(1)	27.27	24	3.2	18-48	17.0%	18.0%
UK/Lexington (2)	26.32	n/a	3.59	n/a	n/a	n/a

1) University of Kentucky, College of Engineering, Paducah Campus, Fall 2005

(2) University of Kentucky, Office of Institutional Research, Fall 2004 Applicants

### Mean Score Comparisons by Campus

The following table represents mean and standard deviation scores for all 47 survey items, separated by campus. Following this table is an interpretation of selected data the authors believe to be significant.

Table 2: Survey Responses - Means and Standard Deviations

Survey Questions	UK-Lexington		UK-Paducah	
	Mean	SD	Mean	SD
General questions: (1-Strongly Disagree, 2-Disagree, 3-Agree, 4-Strongly Agree)				
My experiences since coming to UK have led me to become more understanding of racial/ethnic differences.	2.76	0.54	2.47	0.55
At UK, most students are resentful of others whose race/ethnicity is different from their own.	2.00	0.55	1.84	0.61
UK should have a requirement for graduation that students take at least one course on the role of ethnicity and race in society.	1.86	0.79	1.77	0.65
UK does not promote respect for racial/ethnic diversity.	1.81	0.51	1.83	0.59
UK does not promote respect for gender diversity.	1.71	0.46	1.91	0.68
UK provides an environment for the free and open expression of ideas.	3.10	0.30	3.07	0.51
UK provides an environment for the free and open expression of opinions.	3.14	0.36	3.07	0.46
UK provides an environment for the free and open expression of beliefs.	3.15	0.37	3.07	0.51
I feel comfortable saying what I think about racial/ethnic issues.	3.10	0.54	3.17	0.38
Students of color are as well prepared academically as white students.	2.67	0.58	3.00	0.62
My social interactions on this campus are largely confined to students of my own race/ethnicity.	2.76	0.63	2.84	0.79
I would like to come into contact with members of other racial/ethnic groups to a greater extent.	2.53	0.51	2.63	0.66
I have more friends from different racial/ethnic groups on-campus than off-campus.	2.60	0.68	2.19	0.70
My experiences since coming to UK have strengthened my ethnic identity.	2.29	0.64	2.31	0.60

How much is the following present at UK? (1-Little or None, 2-Some, 3-Quite A Bit, 4-A Great Bit, 5-Not Applicable)

Racial conflict on campus.	1.62	0.87	1.24	0.89
Respect by students for other students of different racial and ethnic groups.	3.05	0.81	3.42	0.87
Racial/ethnic separation on campus.	2.38	0.87	1.83	1.26
Friendship between students of different racial and ethnic groups.	2.76	0.89	2.74	0.88
Interracial tensions in the classroom.	1.19	0.40	1.22	0.88

Continuum (semantic differential scale, 1- 5)

I am not knowledgeable about the culture of different groups <--> I am knowledgeable about the culture of different groups.	3.62	1.07	3.90	0.77
I do not hold stereotypes about other groups <--> I admit my stereotypes about other groups.	2.76	1.09	2.76	1.11
I feel partial to, and more comfortable with, some groups than others <--> I feel equally comfortable with all groups.	2.81	1.17	2.73	1.05
I am drawn to others who are the same as me <--> I am drawn to others who are different.	2.67	0.97	2.49	0.84
I find it more satisfying to work with individuals similar to myself <--> I find it more satisfying to work within a diverse team.	2.62	0.87	2.76	0.97
I feel that everyone is the same, with similar values and preferences <--> I feel that everyone is unique, with differing values and preferences.	3.71	1.01	3.76	1.02
I am puzzled by the culturally different behaviors I see among people <--> I understand cultural influences are at the root of some of the behaviors I see.	3.71	1.03	3.63	0.89
I get annoyed when confronted with someone who speaks little English <--> I show patience and understanding with people who speak little English.	3.71	1.43	3.07	1.27

How important are the following groups toward your personal development? (1-Not important, 2-Somewhat Important, 3-Important)

People with different religious backgrounds.	2.00	0.15	2.12	0.10
People who are gay/lesbian.	1.57	0.15	1.58	0.12
People with physical disabilities.	2.57	0.13	2.33	0.10
People from other countries/national cultures.	2.29	0.12	2.28	0.10
People of different races.	2.24	0.12	2.21	0.10

The climate at UK is... (Continuum 1 - 5)

Friendly <--> Hostile	1.48	0.68	1.44	0.83
Concerned <--> Indifferent	2.75	0.91	2.20	1.10
Competitive <--> Noncompetitive	2.24	0.70	1.84	0.84
Respectful <--> Disrespectful	2.19	0.93	1.77	1.02
Racist <--> Anti-racist	3.62	0.94	3.93	1.03
Sexist <--> Non-sexist	3.57	0.10	3.91	1.06
Homophobic <--> Non-homophobic	3.14	1.09	3.39	0.59



Uncaring <--> Caring	3.95	0.59	4.00	0.98
Survival of the Fittest <--> Nurturing	3.10	1.04	3.37	1.20

My classes at UK (Paducah) have influenced my thinking about...  
(1-Strongly Disagree, 2-Disagree, 3-Agree, 4-Strongly Agree)

National cultures different from my own.	2.55	0.61	2.47	0.70
Gender-related issues.	2.50	0.61	2.42	0.76
Race-related issues.	2.40	0.68	2.35	0.65
Issues related to physical or psychological disability.	2.25	0.79	2.33	0.72
Gay/Lesbian/Bisexual issues.	2.10	0.64	1.98	0.67
Religions different from my own.	2.35	0.67	2.26	0.76

Based on campus data, it appears students at UK-Paducah are more likely to believe students of color are as well prepared academically as white students. Students at UK-Paducah also report having fewer friends from racial/ethnic groups on-campus than off-campus. This is likely due to UK-Paducah's low minority rate of 2.11%. Students at UK's campus believe there is greater racial conflict and a higher degree of racial separation. This may be due largely to the low minority presence at UK-Paducah and the higher percentage minority enrollment at UK.

Students at UK-Paducah (3.07) are also more likely than UK students (3.71) to exhibit some annoyance with non-English speaking individuals. This is likely due to students at the Lexington campus encountering more non-English speaking persons due to the urban nature of the campus, as opposed to the Paducah campus which is situated among a more rural population (see Appendix A).

In comparison of campus climates, students at UK-Paducah report having a more concerned, more respectful, and less competitive environment than students at UK's main campus.

#### Comparison by Variables

The researchers examined survey data by a number of variables including sex, age, class, parent's highest education level, hours employed per week, previous attendance at other institutions (and types), hometown size, and distance from campus. To the researchers' surprise, neither age nor hours employed per week revealed any significant findings.

The first variable that yielded some interesting findings was students' gender. In all instances, it appears female respondents feel more discriminated against and view the campus climate as more discriminatory and sexist. Female respondents also rated their respective campus climates as more competitive and less respectful than their male counterparts. When asked about their personal sentiments regarding various issues, female respondents reported being less knowledgeable about other cultures and different groups, less likely to hold stereotypes, and more likely to believe everyone is the same with regards to holding similar values and preferences. Females were also more likely to agree all students should be required to take at least once course on the role of ethnicity and race in society.

Academic class was the next variable examined. Although representation for each class was not available for both campuses, some data were still significant. Data reveal that students believe their respective campuses become less concerned and less respectful the further they progress in their studies. Disturbingly, data also indicate students believe the institutional climate grows more racist, sexist, and homophobic as they progress through their respective programs.

Next, responses were examined based on the variable “most educated parent’s highest education level.” Most significant findings occurred in the construct measuring personal perceptions of various issues. With regards to students’ self-reported knowledge of other cultural groups, students with a parent having a college degree scored the lowest (3.33), whereas students who had a parent that completed high school rated significantly higher responses (4.07). This is quite contrary to traditional beliefs about parent’s educational levels and socialization effects. Students with a parent who had some college appeared to rate the highest responses in most every category, including comfortableness with other groups, being drawn to others who are different from themselves, and preference to work with a diverse team. Interestingly, students with a parent having a college degree consistently reported the lowest scores in these same categories.

Students’ previous enrollment at other institutions was the next factor to be examined. Data suggest students who had previously attended a community college were more knowledgeable of other cultures, more drawn to others who are different from themselves, more likely to believe everyone is unique, and more likely to believe cultural influences are at the root of some behaviors respondents’ witness. Interestingly, students who had never attended another institution and students who had previously attended another four-year institution responded with similar responses. This may suggest (on the surface) that community colleges are more likely to promote cultural awareness than four-year institutions. Further research in this area is warranted.

Students’ hometown size was examined next, primarily looking for differences between urban and rural student responses. Most differences occurred in the campus climate construct, as student from urban areas were more likely to view their respective campuses as less concerned, less respectful, more homophobic, more sexist and more uncaring than students from rural areas.

Finally, students’ responses were examined based on their proximity to campus. Students from 0-10 miles from campus were less likely to believe students of color are as well-prepared academically as white students. These same students also reported having fewer friendships with students of different racial and ethnic groups, which could explain this phenomenon. These students were also more likely to believe their campuses were less concerned and respectful than other students from greater distances from campus. Students within 20 miles of their campus were more likely to show patience and understanding with people who speak little English, however. Interestingly, students 21-50 miles from campus were more likely to hold stereotypes about other groups. This may be a result of deep rural roots, as rural areas are typically less ethnically diverse than urban areas. Students 11-20 miles from campus rated their campuses as significantly less homophobic than any other proximity group (4.13 compared to 3.18, 3.12, and 3.5).

## Comment Analysis

It is worthy to note that some engineering students believe the nature of engineering limits awareness and discussion of issues like diversity. One student commented, "Being an engineering student I don't have time to explore these issues." Although engineering is one of the more technical fields, it is still possible to promote awareness of issues such as diversity. In fact, most engineering programs' mission statements address having students well-prepared to compete in a global workforce. Unfortunately, some students believe there is no room for these issues within their major, as these are life lessons and issues that everyone should consider and learn to respect. Moreover, this belief is disappointing when one considers that the products of the work of engineers affect people and entire cultures in all manners of everyday life, from the dwellings in which people live and work, to the bridges and roads that they traverse, to the appliances used to prepare meals and maintain lifestyles, to the technology implemented to make advancements in all areas of life. There is little in life that is not somehow touched and impacted by the engineering field and its professionals.

## Limitations

One major limitation to data collection rests with the inconsistencies in information that is reported by individual institution's Institutional Research offices, both in terms of the type of data and the level of detail. For specific program data, a site director is generally the "gatekeeper". Even with full cooperation from gatekeepers at branch campuses it is still often difficult to collect uniform data, especially when the requested data is different from common data sets shared by various institutions.

Because this study is limited to an engineering program with a main and regional campus structure, the results and conclusions both from the existing data analysis and from the survey responses cannot be extended nor generalized to the situations of other programs with similar campus structures nor of engineering programs in general. The results can, however, serve as a basis for further research on the issues of diversity in engineering education.

## Implications, Lessons Learned, and Future Considerations

This research has significant implications for home and extended campus programs. This is largely due to the issues this study was able to identify and also because this is the first study of its kind. This research should serve as a template for future, similar studies, and might serve as a useful evaluation and benchmark measure for institutions with home and extended campuses. Program administrators may also benefit from this research as it will provide greater insights with regards to their students' quality (comparatively speaking) as well as their students' perceptions of the current program. Because issues of race, gender, and diversity are rarely mentioned in the engineering classroom, this research should serve as a solid reminder that they should be.

The first recommendation for others interested in conducting a study similar to this one would be to have already established key contacts at other campuses, or in the case of multi-institutional studies, other institutions. This should not be limited to program directors, but also

persons in charge of institutional research and anyone else who is close to institutional data. Researchers should also be very realistic regarding the time constraints of the project and the amount of time it will take to collect data. Although the researchers may be able to obtain data from their own institution very quickly, asking personnel at other campuses (or institutions) to gather data will generally take some time. One should also be aware many of the national databases and common data sets do not necessarily provide the types of data you may be looking for. This is why it is so important to have key personnel at other institutions that can provide much-needed assistance. Finally, the researchers believe it would be in the best interest of those conducting the study to establish rapport with admissions and student affairs personnel at other campuses as well. These individuals are often gatekeepers to qualitative data that facts and figures alone cannot measure. The research team highly suggests anyone planning a project of this nature heed this advice.

### Contribution to Field

This research is important because it is the first study of its kind to draw comparisons between home and extended campuses with regards to both basic demographic data and student perceptual differences. This study unveiled a number of findings that were inconsistent with previous literature, as well as identified a number of new avenues for future studies. In addition to serving as a template for future studies, this piece also adds value to previous efforts because it attempts to further a dialogue and increase an awareness concerning the importance of diversity to the future of engineering education.

### Future Research and Corollary Studies

UK-Paducah displays the lowest female engineering enrollment rate 11.63%, though not significantly lower than UK's main campus program. In addition, the 2.11% racial minority enrollment rate leads the researchers to recommend that further study be conducted in the area of diversity of enrollments in rurally-situated engineering education programs.

While there appears to be no apparent link/trend between the urban population rate and African American college enrollment, there does appear to be a connection between Asian college enrollments and the urban population rate: the top two urban campuses have the highest Asian college enrollment, and the top two rural campuses have the lowest Asian college enrollment rate. Future research needs to be done in this area. Depending on potential generalizability, this trend could have significant and important (negative) consequences for attempts to introduce a higher degree of diversity in engineering education programs serving rural populations, thus leaving such students behind the curve in terms of knowledge, understanding, and appreciation for other cultural perspectives and concerns necessary to prepare them to compete in a global engineering marketplace.

Because the definition of rural is so broad and because there are oftentimes dramatic differences in what is considered rural, the researchers suggest future research focus on issues pertaining to proximity to campus, particularly in rural areas. This research found almost half of the rural students attending the extended campus transferred from a community college. Future

research should evaluate student outcomes for those beginning the program anew and for those who transferred from another institution.

Another idea of interest would be to conduct a longitudinal study of students' perceptions at several campuses. This research found as students progress from freshmen to senior status, their perspective of the campus changes rather unfavorably. Additional research might corroborate or conflict with this finding, but the results would be interesting nonetheless.

One of the most surprising findings of this study was students who had a parent with a college degree believed they knew considerably less about other cultures than did students whose most educated parent only had a high school education. Whether these students really are less aware or whether something greater is going on with the notion of perceptions based on socialization and family cultures would be very interesting to see.

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## Appendix A

### *Percent Race/Gender/Urban/Rural of Population / College Enrolled - Summary of Counties Adjacent to UK Campuses*

	<b>UK/Lexington</b>	<b>UK/Paducah</b>	<b>Total</b>	<b>UK/Lexington</b>	<b>UK/Paducah</b>	<b>Total</b>
<b>Percent Race:</b>	<b>College Enrolled (1)</b>			<b>Population (2)</b>		
White	87.90%	92.18%	90.04%	87.55%	83.08%	130.34%
B/AA	8.00%	6.90%	7.45%	8.86%	5.15%	10.73%
AI/AN	0.20%	0.47%	0.34%	0.21%	0.22%	0.38%
Asian	3.40%	0.17%	1.79%	1.61%	0.29%	1.84%
NH/PI	0.00%	0.00%	0.00%	0.03%	0.02%	0.03%
Other	0.50%	0.28%	0.39%	0.83%	0.44%	0.83%
<b>Number/Percent Gender:</b>	<b>College Enrolled (3)</b>			<b>Undergrad. Engineering Enrollment (4)</b>		
Total	40,371	5,270	45,641	1,528	43	1,571
Male	18,580	2,324	20,904	1,310	38	1,348
Female	21,791	2,946	24,737	218	5	223
% Male	46.02%	44.10%	45.80%	85.73%	88.37%	87.05%
% Female	53.98%	55.90%	54.20%	14.27%	11.63%	12.95%
<b>Number/Percent Urban/Rural:</b>	<b>Population (5)</b>					
Total	469,198	171,269	640,467			
Urban	384,064	70,462	454,526			
Rural	95,434	101,347	196,781			
% Urban	81.86%	41.14%	70.97%			
% Rural	20.34%	59.17%	30.72%			

(1) U.S. Census Bureau, 2000, P147A-P147F School Enrollment by Level of School by Type of School for the Population 3 Years and Over (White Alone, Black or African American Alone, American Indian and Alaska Native Alone, Asian Alone, Native Hawaiian and Other Pacific Islander Alone, and Some Other Race Alone)

(2) U.S. Census Bureau, 2000, P5. Race for Population 18 years and over

(3) U.S. Census Bureau, 2000, P36. Sex by School Enrollment by Level of School by Type of School for the Population 3 Years and Over

(4) IPEDS, Institutions Data Report, <http://nces.ed.gov/ipedsas/reportOnVars.asp>; University of Kentucky, College of Engineering, Fall 2005

(5) U.S. Census Bureau, 2000, P2. Urban and Rural, Total Population

## Appendix B

### *Bachelor's Degrees by Race, Gender, and Field (All, Engineering), 2001*

<b>Gender/Race</b>	<b>All Undgr.</b>	<b>Male</b>	<b>Female</b>	<b>White</b>	<b>B/AA</b>	<b>Asian/PI</b>	<b>AI/AN</b>	<b>Hispanic</b>	<b>Other</b>	<b>Temp.</b>
All Fields	1,257,648	536,023	721,625	888,412	106,648	75,496	8,664	89,972	48,977	39,479
Engineering	59,258	47,344	11,914	38,767	2,884	7,025	256	4,016	1,891	4,419
<b>Percentage - All Fields:</b>		42.62%	57.38%	70.64%	8.48%	6.00%	0.69%	7.15%	3.89%	3.14%
<b>Percentage - Engineering:</b>		79.89%	20.11%	65.42%	4.87%	11.85%	0.43%	6.78%	3.19%	7.46%

National Science Foundation, Divisions of Science Resources Statistics, Special Tabulations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey, 2001.

## Appendix C

### *Age for Engineering Student Survey Respondents*

<b>Campus</b>	<b>Number Respond.</b>	<b>Age</b>				<b>% 25 &amp; Over</b>
		<b>Mean</b>	<b>Minimum</b>	<b>Maximum</b>	<b>25 &amp; Over</b>	
Lexington	21	23.05	21	36	1	5%
Paducah	42	24.07	18	49	14	33%

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005

### *Gender of Engineering Student Survey Respondents*

<b>Campus</b>	<b>Number Respond.</b>	<b>Number</b>		<b>Percent</b>	
		<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>
Lexington	21	16	5	76%	24%
Paducah	43	38	5	88%	12%

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005

### *Race for Engineering Student Survey Respondents*

<b>Campus</b>	<b># Resp.</b>	<b>Race</b>							
		<b>White</b>	<b>African Amer.</b>	<b>Asian Amer.</b>	<b>SE Asian/ Pac. Isl.</b>	<b>Amer. Indian</b>	<b>Hisp./ Latino</b>	<b>2 or More Other</b>	
Lexington	21	18	-	1	1	-	-	1	-
Paducah	43	39	2	1	-	0	0	0	1
<b>Lexington / %</b>		<b>85.7%</b>	<b>0.0%</b>	<b>4.8%</b>	<b>4.8%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>4.8%</b>	<b>0.0%</b>



**Paducah / %**                      **90.7%**    **4.7%**    **2.3%**            **0.0%**    **0.0%**    **0.0%**    **0.0%**    **2.3%**

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005

*Class Status of Engineering Student Survey Respondents*

<b>Campus</b>	<b>Number</b>					
	<b>Respond.</b>	<b>Fresh.</b>	<b>Sopho.</b>	<b>Junior</b>	<b>Senior</b>	<b>Graduate</b>
Lexington	21	-	-	-	19	2
Paducah	43	9	2	12	20	-
<b>Lexington / %</b>					90.5%	9.5%
<b>Paducah / %</b>		20.9%	4.7%	27.9%	46.5%	

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005

*Size of Hometown of Engineering Student Survey Respondents (Urban/Rural)*

<b>Campus</b>	<b>Number</b>						
	<b>Respond.</b>	<b>City</b>	<b>Suburb</b>	<b>Small Town</b>	<b>Rural Area</b>	<b>Other</b>	<b>Some Combin.</b>
Lexington	21	4	6	6	4	-	1
Paducah	43	3	3	13	23	-	1
<b>Lexington / %</b>		19.0%	28.6%	28.6%	19.0%	0.0%	4.8%
<b>Paducah / %</b>		7.0%	7.0%	30.2%	53.5%	0.0%	2.3%

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005

*Distance of Residence from Campus of Engineering Student Survey Respondents*

<b>Campus</b>	<b>Number</b>				
	<b>Respond.</b>	<b>0-10 mi</b>	<b>11-20 mi</b>	<b>21-50 mi</b>	<b>51+ mi</b>
Lexington	21	18	1	1	1
Paducah	43	15	7	18	3
<b>Lexington / %</b>		85.7%	4.8%	4.8%	4.8%
<b>Paducah / %</b>		34.9%	16.3%	41.9%	7.0%

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005

*Previous Institutions Attended by Engineering Student Survey Respondents*

<b>Campus</b>	<b>Number Respond.</b>	<b>None</b>	<b>Vocat./ Tech.</b>	<b>Comm. College</b>	<b>Another 4yr Inst.</b>	<b>Other</b>	<b>Some Combin.</b>
Lexington	21	12	-	4	5	-	-
Paducah	43	13	-	20	5	1	4
<b>Lexington / %</b>		57.1%	0.0%	19.0%	23.8%	0.0%	0.0%
<b>Paducah / %</b>		30.2%	0.0%	46.5%	11.6%	2.3%	9.3%

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005

*Parental Educational Attainment Level of Engineering Student Survey Respondents*

<b>Campus</b>	<b>Number Respond.</b>	<b>&gt; HS / Some HS</b>	<b>HS Grad.</b>	<b>Some College</b>	<b>College Grad.</b>	<b>Graduate Degree</b>
Lexington	21	-	3	2	7	9
Paducah	43	2	10	11	8	12
<b>Lexington / %</b>		0.0%	14.3%	9.5%	33.3%	42.9%
<b>Paducah / %</b>		4.7%	23.3%	25.6%	18.6%	27.9%

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005

*Weekly Hours of Employment of Engineering Student Survey Respondents*

<b>Campus</b>	<b>Number Respond.</b>	<b>None</b>	<b>0-10hrs</b>	<b>10-20 hrs</b>	<b>20-30 hrs</b>	<b>31+ hrs</b>
Lexington	21	8	3	6	3	1
Paducah	43	9	7	8	10	9
<b>Lexington / %</b>		38.1%	14.3%	28.6%	14.3%	4.8%
<b>Paducah / %</b>		20.9%	16.3%	18.6%	23.3%	20.9%

Source: Campus Diversity Survey Administered to UK Engineering Students, November 2005