

**Tulsa Alliance for Engineering:  
Analysis of a Survey of TCC Engineering Students**

December 20, 2012  
Office of Planning and Institutional Research



## Executive Summary

In Fall 2012, the Office of Planning and Institutional Research worked with the Tulsa Alliance for Engineering to develop a survey measuring the extent to which different factors influence students' decisions to select and remain in the field of engineering. This summary reports on the sample included as well as the statistical results of the survey.

### *Sample*

The survey was emailed to 841 TCC students who were enrolled during Fall 2012 and were majoring in one of the following seven engineering programs:

AS in Computer Engineering

AS in Electrical and Computer Engineering (for transfer to Oklahoma State University)

AS in Electrical Engineering

AS in Engineering

AS in Mechanical Engineering (for transfer to Oklahoma State University)

AAS in Civil Engineering/Surveying Technology (Construction)

Certificate in Civil Engineering/Surveying Technology

A total of 148 students provided valid responses to the survey via TCC's survey software, Qualtrics, reflecting a 17.6% response rate.

### *Survey*

To assist in the development of the survey, the Coordinator of the Tulsa Alliance for Engineering conducted pilot interviews with students and professionals in the field of engineering, asking about the reasons for why they selected and remained in the field. Using the interview results as a starting point, the Coordinator worked with the Office of Planning and Institutional Research to develop a survey measuring the extent to which 18 factors contributed to students' selection of and continuance in the field of engineering. Respondents were instructed to indicate the extent to which each factor was important to 1) their selection of engineering as a field of study, and 2) their decision to remain in the field of engineering. Students responded to each item by indicating how important each factor was for them on a 5-point scale ranging from 1 = *not at all important* to 5 = *extremely important*. The entire survey is presented in the Appendix at the end of this report.

## Results

Interestingly, the same five factors were rated as most important for both selecting and remaining in the field of engineering, although the exact rank order within the top five differed slightly across the *selecting* and *remaining* ratings. Table 1 below shows the top five most important factors with means for selecting and remaining in the field.

*Table 1. Top Five Most Important Factors for Selecting and Remaining in Engineering (means)*

Selecting Engineering Field	Remaining in Engineering Field
1. Interest in engineering (4.58)	1. Interest in engineering (4.65)
2. Interest in math and science (4.47)	2. Interest in math and science (4.54)
3. Availability of jobs in the field (4.29)	3. Availability of jobs in the field (4.49)
4. Availability of high-paying jobs in field (4.20)	4. Availability of courses in engineering (4.28)
5. Availability of courses in engineering (4.14)	5. Availability of high-paying jobs in field (4.27)

As with the most important factors, the same five factors were rated as least important for both selecting and remaining in the field of engineering, although the exact rank order within the bottom five differed slightly across the *selecting* and *remaining* ratings. Table 2 below shows the five factors (out of 18 total factors) rated as least important with means for selecting and remaining in the field.

*Table 2. Bottom Five Factors for Selecting and Remaining in Engineering (means)*

Selecting Engineering Field	Remaining in Engineering Field
14. Availability of tutoring for classes (3.23)	14. Availability of tutoring for classes (3.50)
15. Involvement in engineering clubs/orgs (3.14)	15. Involvement in engineering clubs/orgs (3.35)
16. Attendance at engineering conferences (3.01)	16. Support from peers (3.28)
17. Support from peers (2.97)	17. Attendance at engineering conferences (3.24)
18. Availability of part-time jobs in the field (2.76)	18. Availability of part-time jobs in the field (3.01)

Moreover, it is noteworthy that all factors were rated as being more important for remaining in the field than for selecting the field. Paired-samples *t*-tests revealed that this difference was statistically significant at the 99% confidence level for 15 of the 18 factors. The largest mean differences among the *selected* and *remaining* ratings were for “connections with professional engineers” (mean difference = .42), “mentoring relationships” (mean difference = .33), “personal accomplishments and accolades in the field” (mean difference = .32), and “support from peers” (mean difference = .31). The three factors for which the difference between *selecting* and *remaining* ratings was not statistically significant were “interest in math and science” (mean difference = .07), “availability of high-paying jobs in the field” (mean difference = .07), and “availability of courses in engineering” (mean difference = .14).

The descriptive statistics for all of the students' responses about how important each factor was for them in *selecting* and *remaining* in the engineering field are shown in Table 3 below.

Table 3. Descriptive Statistics for Survey Items

	N	Minimum	Maximum	Mean	Std. Deviation
Importance for <b>SELECTING</b> Engineering Field					
Support from family	147	1	5	3.64	1.26
Support from peers	147	1	5	2.97	1.22
Support from teachers	146	1	5	3.47	1.31
Mentoring relationships	146	1	5	3.23	1.38
Connections with professional engineers	147	1	5	3.44	1.38
Interest in math and science	148	2	5	4.47	.76
Interest in engineering	146	2	5	4.58	.65
Availability of jobs in the field	146	1	5	4.29	.83
Availability of high-paying jobs in the field	147	1	5	4.20	.90
Availability of part-time jobs in the field	147	1	5	2.76	1.28
Working on 'real-world' projects in school	145	1	5	3.90	1.10
Working on 'real-world' projects outside of school	146	1	5	3.90	1.08
Availability of tutoring for classes	146	1	5	3.23	1.33
Availability of courses in engineering	146	1	5	4.14	1.04
Internship opportunities in engineering	147	1	5	3.79	1.33
Involvement in engineering-related clubs and organizations	147	1	5	3.14	1.28
Attendance at engineering conferences	147	1	5	3.01	1.39
Personal accomplishments and accolades in the field	145	1	5	3.59	1.31

	N	Minimum	Maximum	Mean	Std. Deviation
<b>Importance for <u>REMAINING</u> in Engineering Field</b>					
Support from family	137	1	5	3.79	1.24
Support from peers	137	1	5	3.28	1.27
Support from teachers	136	1	5	3.72	1.20
Mentoring relationships	133	1	5	3.53	1.34
Connections with professional engineers	138	1	5	3.84	1.26
Interest in math and science	139	2	5	4.54	.69
Interest in engineering	136	3	5	4.65	.56
Availability of jobs in the field	136	1	5	4.49	.72
Availability of high-paying jobs in the field	139	1	5	4.27	.84
Availability of part-time jobs in the field	137	1	5	3.01	1.41
Working on 'real-world' projects in school	135	1	5	4.07	.94
Working on 'real-world' projects outside of school	137	1	5	4.14	.96
Availability of tutoring for classes	138	1	5	3.50	1.32
Availability of courses in engineering	138	1	5	4.28	.98
Internship opportunities in engineering	138	1	5	4.00	1.21
Involvement in engineering-related clubs and organizations	138	1	5	3.35	1.28
Attendance at engineering conferences	137	1	5	3.24	1.39
Personal accomplishments and accolades in the field	137	1	5	3.91	1.18

## Conclusions

The present findings suggest that engineering students at TCC both select and remain in the engineering field for similar reasons. Although there may be important factors that were not measured in this study, the factors rated as most important to the decisions of students in this study included having interests in math, science, and engineering, as well as the availability of jobs in the field that pay well.

Findings also suggest some factors that seem to play only minor roles in students' decisions to select and remain in the engineering field. These include involvement in engineering-related organizations and conferences, availability of tutoring and part-time jobs in engineering, and support from peers. However, it is interesting that ratings for support from peers showed one of the largest differences between *selected* and *remaining* ratings. In particular, support from peers seems to be significantly more important for remaining in the field than for initially selecting engineering as a field of study.

Similar to ratings for support from peers, 14 other factors demonstrated significantly higher ratings for remaining in the field than for selecting the field, suggesting that many of these factors play an important role in keeping students in engineering, once they enter the field. Specifically, connections with professional engineers, mentoring relationships, and personal accomplishments in engineering seem to be particularly more important for remaining in the field than for selecting the field.

## Appendix

Please indicate how important each factor below has been for you in A.) selecting the engineering field and B.) remaining in the engineering program.

	A.) Importance for SELECTING the engineering field					B.) Importance for REMAINING in the engineering field				
	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
Support from family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support from peers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support from teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mentoring relationships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Connections with professional engineers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interest in math and science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interest in engineering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of jobs in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of high-paying jobs in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of part-time jobs in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working on 'real-world' projects in school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working on 'real-world' projects outside of school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of tutoring for classes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of courses in engineering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internship opportunities in engineering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involvement in engineering-related clubs and organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attendance at engineering conferences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal accomplishments and accolades in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

