

Appendix F: Data Summaries

Table F1: Resource Point Allocation Survey

| Section | Name | Faculty (F) Mean | Industry (I) Mean | Younger Alumni (YA) Mean | Older Alumni (OA) Mean | Pairs with Statistically Significant Differences | Total Survey Mean | Trend Type * |
|---------|---|------------------|-------------------|--------------------------|------------------------|--|-------------------|--------------|
| 2.1 | Engineering Reasoning and Problem Solving | 12.58 | 12.53 | 14.97 | 15.18 | - | 14.05 | H |
| 2.2 | Experimentation and Knowledge Discovery | 9.33 | 6.27 | 8.06 | 7.47 | F-I | 7.94 | - |
| 2.3 | System Thinking | 7.73 | 8.93 | 6.88 | 5.53 | F - OA, I - YA, I - OA | 7.16 | - |
| 2.4 | Personal Skills and Attitudes | 7.23 | 7.73 | 6.39 | 6.80 | - | 6.92 | L |
| 2.5 | Professional Skills and Attitudes | 6.36 | 7.36 | 5.64 | 6.82 | - | 6.34 | L |
| 3.1 | Teamwork | 7.36 | 8.07 | 8.65 | 9.00 | - | 8.30 | - |
| 3.2 | Communications | 9.18 | 10.07 | 8.70 | 10.63 | - | 9.42 | H |
| 4.1 | External and Societal Context | 4.78 | 5.08 | 4.35 | 3.33 | F - OA, I - OA | 4.38 | L |
| 4.2 | Enterprise and Business Context | 3.86 | 5.79 | 4.53 | 3.86 | F - I, I - OA | 4.46 | L |
| 4.3 | Conceiving and Engineering Systems | 8.32 | 9.13 | 8.63 | 8.50 | - | 8.61 | - |
| 4.4 | Designing | 9.73 | 9.80 | 9.75 | 9.88 | - | 9.78 | H |
| 4.5 | Implementing | 5.27 | 6.31 | 6.64 | 6.12 | - | 6.13 | L |
| 4.6 | Operating | 4.50 | 5.23 | 5.16 | 5.94 | - | 5.16 | L |

* Statistically significant difference between Total Survey Mean and the mean of the Total Survey Means
H - Positive Difference, L - Negative Difference

Table F2: Proficiency Level Survey

| Section | Name | Faculty (F) Mean | Industry (I) Mean | Younger Alumni (YA) Mean | Older Alumni (OA) Mean | Pairs with Statistically Significant Differences | Total Survey Mean | Trend Type * |
|---------|---|------------------|-------------------|--------------------------|------------------------|--|-------------------|--------------|
| 2.1 | Engineering Reasoning and Problem Solving | 3.95 | 3.75 | 4.06 | 4.12 | - | 4.02 | H |
| 2.2 | Experimentation and Knowledge Discovery | 3.43 | 2.87 | 3.38 | 3.33 | - | 3.29 | - |
| 2.3 | System Thinking | 3.11 | 2.94 | 2.62 | 2.47 | - | 2.74 | - |
| 2.4 | Personal Skills and Attitudes | 3.50 | 3.50 | 3.59 | 3.00 | - | 3.44 | H |
| 2.5 | Professional Skills and Attitudes | 3.09 | 3.00 | 3.09 | 2.71 | - | 3.01 | - |
| 3.1 | Teamwork | 3.25 | 3.50 | 3.26 | 2.87 | - | 3.27 | - |
| 3.2 | Communications | 3.73 | 3.69 | 3.62 | 3.71 | - | 3.66 | H |
| 4.1 | External and Societal Context | 2.00 | 2.00 | 2.06 | 1.59 | - | 1.96 | L |
| 4.2 | Enterprise and Business Context | 1.62 | 2.06 | 1.91 | 1.53 | - | 1.79 | L |
| 4.3 | Conceiving and Engineering Systems | 3.30 | 3.00 | 3.09 | 2.81 | - | 3.07 | - |
| 4.4 | Designing | 3.45 | 2.94 | 3.62 | 3.53 | I - YA, I - OA | 3.43 | H |
| 4.5 | Implementing | 2.14 | 2.25 | 2.44 | 2.65 | - | 2.35 | L |
| 4.6 | Operating | 2.00 | 2.06 | 2.24 | 2.18 | - | 2.13 | L |

* Statistically significant difference between Total Survey Mean and the mean of the Total Survey Means
H - Positive Difference, L - Negative Difference

Table F3: XXX Level Survey

| Sub-Section | Name | Faculty Mean | Industry Mean | α | Trend Type * | Total Survey Mean | Interim Proficiency | Final Proficiency |
|-------------|--------------------------|--------------|---------------|----------|--------------|-------------------|---------------------|-------------------|
| 2.1.1 | Problem Identification | 0.35 | 0.44 | 0.6098 | A | 0.39 | 4.4 | 4 |
| 2.1.2 | Modeling | 0.50 | -0.17 | 0.0023 | RD | 0.23 | 4.3 | 4 |
| 2.1.3 | Estimation | 0.04 | -0.06 | 0.6981 | A | 0.00 | 4.0 | 4 |
| 2.1.4 | Uncertainty | -0.54 | -0.06 | 0.0490 | RD | -0.34 | 3.7 | 4 |
| 2.1.5 | Solution | -0.23 | -0.17 | 0.7695 | A | -0.20 | 3.8 | 4 |
| 2.2.1 | Hypothesis | 0.00 | 0.28 | 0.1444 | A | 0.11 | 3.4 | 3 |
| 2.2.2 | Literature | 0.46 | 0.17 | 0.1804 | A | 0.34 | 3.0 | 3 |
| 2.2.3 | Experiment | -0.27 | -0.44 | 0.4069 | A | -0.34 | 3.6 | 4 |
| 2.2.4 | Defense | -0.04 | 0.06 | 0.6208 | A | 0.00 | 3.3 | 3 |
| 2.3.1 | Holistics | 0.19 | 0.06 | 0.4592 | A | 0.14 | 2.9 | 3 |
| 2.3.2 | Emergence | -0.15 | -0.22 | 0.7511 | A | -0.18 | 2.6 | 3 |
| 2.3.3 | Focusing | -0.19 | 0.00 | 0.3157 | A | -0.11 | 2.7 | 3 |
| 2.3.4 | Trade-Offs | 0.19 | 0.33 | 0.4607 | A | 0.25 | 3.1 | 3 |
| 2.4.1 | Initiative | -0.04 | 0.22 | 0.1763 | A | 0.07 | 3.4 | 3 |
| 2.4.2 | Perseverance | 0.31 | 0.61 | 0.1140 | A | 0.43 | 3.8 | 4 |
| 2.4.3 | Creative Thinking | 0.12 | 0.22 | 0.6140 | A | 0.16 | 3.6 | 4 |
| 2.4.4 | Critical Thinking | 0.50 | 0.17 | 0.0757 | A | 0.36 | 3.8 | 4 |
| 2.4.5 | Personal Awareness | -0.42 | -0.56 | 0.5217 | A | -0.48 | 2.9 | 3 |
| 2.4.6 | Lifelong Learning | -0.23 | -0.33 | 0.6354 | A | -0.27 | 3.1 | 3 |
| 2.4.7 | Time Management | -0.04 | -0.22 | 0.4129 | A | -0.11 | 3.3 | 3 |
| 2.5.1 | Ethics | 0.77 | 0.61 | 0.3168 | A | 0.70 | 3.7 | 4 |
| 2.5.2 | Professional Behavior | -0.38 | -0.11 | 0.0734 | A | -0.27 | 2.7 | 3 |
| 2.5.3 | Career Planning | -0.31 | -0.22 | 0.6393 | A | -0.27 | 2.7 | 3 |
| 2.5.4 | Currency | -0.08 | -0.17 | 0.6600 | A | -0.11 | 2.9 | 3 |
| 3.1.1 | Forming Teams | 0.19 | 0.00 | 0.3688 | A | 0.11 | 3.4 | 3 |
| 3.1.2 | Team Operations | 0.81 | 0.50 | 0.0730 | A | 0.68 | 4.0 | 4 |
| 3.1.3 | Growth Operations | -0.62 | -0.50 | 0.5274 | A | -0.57 | 2.7 | 3 |
| 3.1.4 | Leadership | -0.04 | 0.39 | 0.0791 | A | 0.14 | 3.4 | 3 |
| 3.1.5 | Technical Teams | -0.31 | -0.39 | 0.7464 | A | -0.34 | 3.0 | 3 |
| 3.2.1 | Communication Strategy | 0.00 | -0.22 | 0.3537 | A | -0.09 | 3.5 | 4 |
| 3.2.2 | Communication Structure | 0.35 | -0.06 | 0.1083 | A | 0.18 | 3.8 | 4 |
| 3.2.3 | Written Communication | 0.42 | 0.17 | 0.1666 | A | 0.32 | 3.9 | 4 |
| 3.2.4 | Electronic Communication | -0.62 | -0.28 | 0.0433 | SD | -0.48 | 3.1 | 3 |
| 3.2.5 | Graphical | -0.27 | -0.11 | 0.4461 | A | -0.20 | 3.4 | 3 |
| 3.2.6 | Oral | 0.31 | 0.72 | 0.0401 | SD | 0.48 | 4.1 | 4 |

| Sub-Section | Name | Faculty Mean | Industry Mean | α | Trend Type * | Total Survey Mean | Interim Proficiency | Final Proficiency |
|-------------|---------------------------|--------------|---------------|----------|--------------|-------------------|---------------------|-------------------|
| 4.1.1 | Roles of Engineers | 0.27 | 0.17 | 0.6269 | A | 0.23 | 2.2 | 2 |
| 4.1.2 | Impact of Engineering | 0.65 | 0.28 | 0.0236 | SD | 0.50 | 2.5 | 3 |
| 4.1.3 | Regulation of Engineers | -0.19 | -0.33 | 0.5621 | A | -0.25 | 1.7 | 2 |
| 4.1.4 | Cultural Context | -0.85 | -0.44 | 0.0273 | SD | -0.68 | 1.4 | 2 |
| 4.1.5 | Contemporary Issues | 0.19 | 0.11 | 0.6466 | A | 0.16 | 2.2 | 2 |
| 4.1.6 | Global Perspective | 0.00 | 0.17 | 0.5128 | A | 0.07 | 2.1 | 2 |
| 4.2.1 | Enterprise Culture | -0.23 | -0.22 | 0.9660 | A | -0.23 | 1.6 | 2 |
| 4.2.2 | Strategy | 0.35 | 0.39 | 0.8331 | A | 0.36 | 2.2 | 2 |
| 4.2.3 | Entrepreneurship | -0.04 | 0.00 | 0.8345 | A | -0.02 | 1.8 | 2 |
| 4.2.4 | Organizations | -0.12 | 0.06 | 0.3653 | A | -0.05 | 1.8 | 2 |
| 4.3.1 | System Goals | 0.04 | 0.28 | 0.0911 | A | 0.14 | 3.2 | 3 |
| 4.3.2 | Concepts | -0.04 | 0.28 | 0.1477 | A | 0.09 | 3.2 | 3 |
| 4.3.3 | Modeling | 0.19 | -0.28 | 0.0008 | RD | 0.00 | 3.1 | 3 |
| 4.3.4 | Management | -0.19 | 0.06 | 0.3358 | A | -0.09 | 3.0 | 3 |
| 4.4.1 | Design Process | 0.62 | 0.44 | 0.3495 | A | 0.55 | 3.9 | 4 |
| 4.4.2 | Process Phasing | -0.62 | -0.39 | 0.2440 | A | -0.52 | 2.9 | 3 |
| 4.4.3 | Knowledge Utilization | 0.04 | 0.06 | 0.9358 | A | 0.05 | 3.4 | 3 |
| 4.4.4 | Disciplinary Design | 0.00 | 0.11 | 0.6173 | A | 0.05 | 3.4 | 3 |
| 4.4.5 | Multidisciplinary Design | 0.08 | -0.17 | 0.1810 | A | -0.02 | 3.4 | 3 |
| 4.4.6 | Design For X | 0.12 | 0.11 | 0.9855 | A | 0.11 | 3.5 | 4 |
| 4.5.1 | Implementation Process | -0.04 | -0.06 | 0.9437 | A | -0.05 | 2.3 | 2 |
| 4.5.2 | Manufacturing | -0.04 | -0.44 | 0.0457 | RD | -0.20 | 2.1 | 2 |
| 4.5.3 | Software | 0.12 | 0.11 | 0.9833 | A | 0.11 | 2.4 | 2 |
| 4.5.4 | HW/SW | -0.04 | 0.28 | 0.1077 | A | 0.09 | 2.4 | 2 |
| 4.5.5 | Test, Verification | 0.27 | 0.61 | 0.0723 | A | 0.41 | 2.7 | 3 |
| 4.5.6 | Implementation Management | -0.27 | -0.28 | 0.9712 | A | -0.27 | 2.0 | 2 |
| 4.6.1 | Operations Procedure | 0.46 | 0.28 | 0.3379 | A | 0.39 | 2.6 | 3 |
| 4.6.2 | Training/ Operations | -0.12 | 0.06 | 0.3938 | A | -0.05 | 2.2 | 2 |
| 4.6.3 | Support | 0.12 | 0.28 | 0.4262 | A | 0.18 | 2.4 | 2 |
| 4.6.4 | Improvements | 0.27 | 0.11 | 0.4686 | A | 0.20 | 2.4 | 2 |
| 4.6.5 | Disposal | -0.54 | -0.83 | 0.0432 | SD | -0.66 | 1.5 | 2 |
| 4.6.6 | Operations Management | -0.23 | 0.17 | 0.0876 | A | -0.07 | 2.3 | 2 |

* A - Agreement ($> .05$)

SD - Statistical Disagreement ($\leq .05$), difference only in magnitude.

RD - Real Disagreement ($\leq .05$), qualitative difference in change.