The Association for Information Systems and Temple University, Fox School of Business

2013 INFORMATION SYSTEMS JOB INDEX

Learn about careers in information systems including demographics, placement, job types, career resources, and levels of knowledge

Munir Mandviwalla, Crystal Harold, Paul Pavlou, Tony Petrucci

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P.O. Box 2712
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E-mail: onestop@aisnet.org
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Institute for Business and Information Technology
Fox School of Business, Temple University
1810 N. 13th Street
210 Speakman Hall
Philadelphia, PA 19122
Email: ibit@temple.edu
Web: ibit.temple.edu
215.204.5642

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FOREWORD

The Institute for Business and Information Technology (IBIT) at the Fox School of Business, Temple University is proud to partner with the Association for Information Systems to produce the first ever Information Systems (IS) Job Index. The report is intended for high school counselors, prospective and current students, IS academics, HR professionals, hiring managers, and legislators.

Founded in 1994 and with members from over 90 countries, AIS serves society through the advancement of knowledge and the promotion of excellence in the practice and study of information systems. AIS is the premier professional association for individuals and organizations who lead the research, teaching, practice, and study of information systems worldwide.

Founded in 2000, Temple University Fox School's IBIT provides cutting-edge knowledge and connections to sustain excellence in IT. IBIT with its corporate partners integrates industry perspectives with academic research expertise to create forums and knowledge for generating and exchanging best practices.

The AIS – Temple Fox School Job Index is a joint five year project to produce reliable national level data on placement, type of jobs, satisfaction, and on related factors such as career services, knowledge level, preparedness, and search strategies. The project will produce an annual IS job index report and is intended to become the first systematic assessment of the IS job market. The findings will serve prospective students and the larger society to better define the role of the IS student, and development of curriculum, admissions standards, career services, and other support. This report is the first step in achieving the above goals and included the following steps:

- Identify foundational theories and job categories and metrics in the literature.
- Create a reliable and rigorous survey instrument usable longitudinally.
- Engage employers, HR experts, and AIS student chapter members.
- Engage academic leaders – form a National Advisory Board.
- Engage and identify top 50 programs nationally to involve in data collection. Each program receives a customized confidential report in exchange for participation. Students receive compensation and prizes for participation.

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48. Villanova University

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Finally, we thank our national advisory board for their support and the chairs and students of the 48 universities that participated in this first ever study.

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ABOUT THE AUTHORS

MUNIR MANDVIWALLA is Associate Professor, founding Chair of MIS, and Executive Director, Institute for Business and Information Technology, Fox School of Business, Temple University. He has published articles on collaborative systems, social media, virtual teams, software training, peer review, and universal access and use in major journals such as *Management Information Systems Quarterly* and *Information Systems Research*. He received his Ph.D. from the Programs in Information Science at Claremont Graduate University.

CRYSTAL HAROLD is Assistant Professor and CIGNA Research Fellow, Human Resources Management, Fox School of Business, Temple University. Her research focuses on improving and maintaining the quality of human capital via organizational staffing and management practices that engender favorable perceptions of workplace fairness. Her work appears in top OB/HRM outlets including *Journal of Applied Psychology*, *Personnel Psychology*, *Journal of Management*, and *Journal of Organizational Behavior*. She received her Ph.D. in Industrial/Organizational psychology from George Mason University.

PAUL PAVLOU is Milton F. Stauffer Professor, Associate Dean of Research, Doctoral Programs, and Strategic Initiatives & Chief Research Officer, Fox School of Business, Temple University. His research focuses on e-commerce strategy, digital business strategy, and development of research methods. He was ranked first in the world in publications in the two top MIS journals - *Management Information Systems Quarterly* and *Information Systems Research* for 2010-2012. His work has been cited over 10,000 times by Google Scholar and over 3,000 times in the Institute of Scientific Information. He received his Ph.D. from University of Southern California.

TONY PETRUCCI is Assistant Professor, Human Resources Management, Fox School of Business, Temple University and Managing Partner, Gravitas, LLC. He was a Captain in the US Army, worked for PepsiCo, and as a Vice President of Human Resources for Aramark Corporation. He has written two books titled *Move Up* and *Make Your Move* which are focused on leadership and career development. He received his Ph.D. in Organizational Leadership from Regent University.

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EXECUTIVE SUMMARY

Information Systems (IS) professionals, who apply and develop Information Technology (IT) in organizations, now comprise a significant portion of the IT labor market. IS professionals include system analysts, application and software developers, data analysts, and Chief Information Officers (CIO). They lead IT across a range of industries including hospitals, government, banks, manufacturers, and retailers. They focus on technology and a domain of application and are experts in strategizing, developing, applying, modifying, and sustaining technology to solve problems or leverage new IT-enabled opportunities.

IS professionals work with and rely on computer scientists and engineers to create platforms and focus on understanding requirements and integrating technologies to design solutions that solve practical day-to-day problems (e.g., operations) and increasingly, lead digital innovation (e.g., create digitally enabled products).

In 2012, there were an estimated **2.9 million jobs in the US relevant to IS**.[1] There are approximately **1300 IS programs** in the US which are typically offered in Business Schools, as well as in a few standalone Information Schools or integrated with Computer Science. These programs are typically called *Management Information Systems (MIS), Information Systems (IS), or Computer Information Systems (CIS).*

The recruitment, mindset, education, demographics, career paths, skills, and jobs of IS professionals are different and yet remain poorly understood and rarely promoted. Despite its large and growing size, the IS labor market is largely 'hidden' because it is mixed with computer scientists and computer engineers. There is some recent progress. In 2012, the US expanded the list of STEM (Science, Technology, Engineering, and Math) designated programs to include IS jobs.

The development of the IS workforce is a critical national initiative given the need to improve U.S. productivity and generate new businesses. The Association for Information Systems – Temple University, Fox School Job Index is a national study focusing on demographics, placement, job search process, and knowledge of new IS professionals.

[1] The estimation model is available from the authors.

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The results provide the foundational research needed to 'profile' and establish national benchmarks for the IS labor market. The 2013 inaugural Association for Information Systems – Temple University, Fox School IS Job Index includes more than **twelve hundred student responses from 48 universities** in the United States[2] (see Appendix A). The report includes:

- Demographics (e.g., race, gender, region)
- Job search success (e.g., interviews, offers, salary, benefits)
- Job category and types (e.g., type of industry, type of job)
- Job search process (e.g., applications, satisfaction, preparation, time, resources)
- Level of knowledge (e.g., architecture, design, solutions, communication skills)

The **top 10 observations** from the report are:

1. The IS job market is healthy with high placement levels of 74% overall and 78% upon graduation.
2. Bachelor IS students average salary is $57,212 while Master IS students average salary is $65,394.
3. 76% of IS graduates are satisfied with their jobs, and 76% are confident they will perform well in those jobs. 73% found jobs related to their chosen degree.
4. Information Technology, Financial Services, and Business Services / Consulting are the top industries for IS jobs.
5. The most common job classification is Systems Analyst at 35% for Bachelor students and 28% for Master students.
6. IS students are industrious and use multiple techniques and sources to find jobs.
7. IS students are moderately confident and moderately positive about the job search process.
8. Access to Career Services centers is the most important for getting a job. IS students value faculty support more than central University support.
9. IS students rate themselves knowledgeable about their profession.
10. IS students are 68% male, 55% white, and 28% Asian.

[2] Information systems is a global profession in 90 countries worldwide. The current report focuses on the United States. We plan to expand globally in future years.

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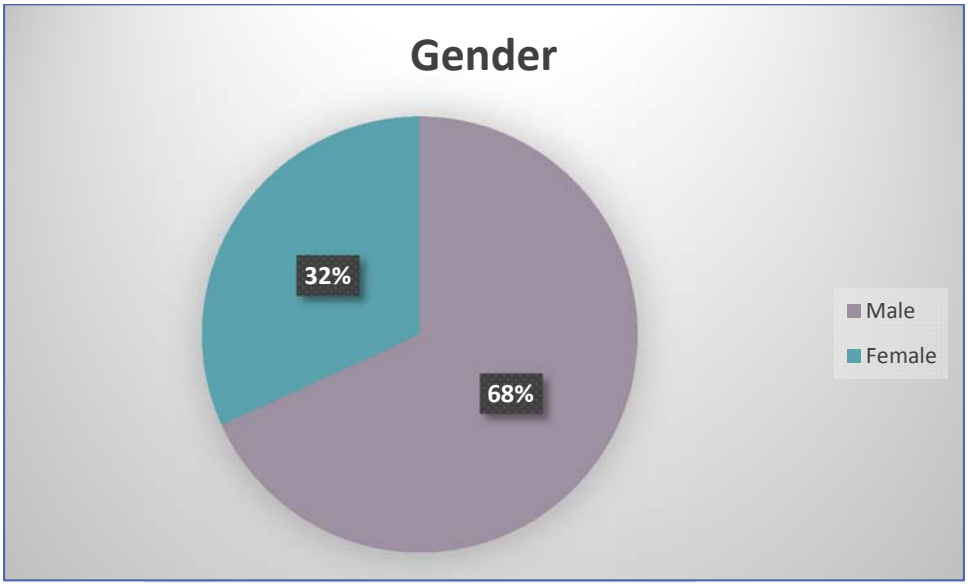
TODAY'S IS STUDENT

The IS student of 2013 who is near graduation is on average 24 years old, has about 3.5 years of job experience and has worked in almost 4 full-time or part-time jobs. The IS student is 68% male and 32% female, and 55% are Caucasian while 28% are Asian.

In 2012, 43% of college enrolled students in the United States were Male with 58% White, 15% Black, 7% Asian, and 17% Hispanic (U.S. Census Bureau, 2013).



68% MALE

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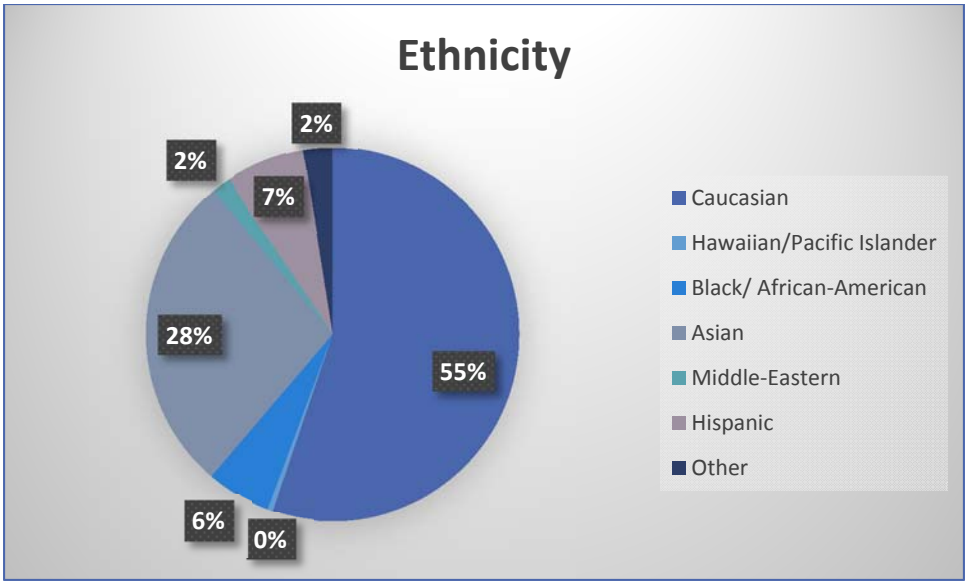

GENDER/ RACE	Caucasian	Hawaiian/ Pacific Islander	Black/ African-American	Asian	Middle-Eastern	Hispanic	Other
Male	518 (60%)	2 (0.20%)	44 (5%)	203 (23%)	13 (1%)	64 (7%)	21 (2%)
Female	182 (45%)	4 (1%)	27 (7%)	148 (37%)	8 (2%)	24 (6%)	10 (2%)

Note: Table lists quantity followed by percentage in parenthesis. Percentages are presented as round numbers and do not add up to 100.

55% WHITE

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THE IS JOB MARKET

The IS Job market is healthy. 74% of the students reported receiving at least one job offer[3]. In contrast, 39% of all college graduates from 2011/2012 report receiving an offer before/upon graduating, and 64% report receiving an offer between 1-6 months (Accenture, 2013).

The largest percentage of students who report receiving offers are from the January 2013 class, with the next highest coming from the May 2013 class. The largest percentage of students reporting offers are from small departments, with large departments in last place.

74% RECEIVE OFFERS

The highest percentage of students receiving offers come from the Southern universities and the lowest are from the Northeast. The percentage of students receiving job offers was approximately the same across bachelor's and master's degree programs.

61% of the students who got an offer, reported receiving one offer, 23% received two, and 9% received 3. A shrinking number received 4 or more offers.

The average salary for Bachelor program students was $57,212, median of $57,000, and standard deviation of $12,703. It is also interesting to note that the quartiles are compacted with the first

$57,212 BACHELOR

$65,394 MASTER

[3] The percentage is based on self-report data that reflects the student's job status at the time the survey was completed. The survey was open for three weeks during April-May 2013 and was sent out by each participating university to its list of graduating students and recent graduates. It is likely that many of the students graduating in May 2013 will have continued to look for jobs and receive offers after the survey cut-off date.

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quartile at $51,000, the second at $57,000, and the third at $62,000.

For comparison, according to NACE, the national average starting salary for all Bachelor students for the class of 2013 is $44,928, $54,234 for all Business students, and $63,100 for MIS (NACE, 2013). For MIS the three quartiles are $48,900, $60,500, and $74,000. The NACE data was collected from employers.

According to CERI, the average starting salary for Bachelor degree - Management Information Systems graduates was $42,062 for 2012-2013 (Career Services and the Collegiate Employment Research Institute, 2013). This data was also collected from employers.

76% SATISFIED WITH JOB OFFER

For Master program students, the average salary was $65,394, standard deviation of $18,168 and a median of $65,000. According to NACE, the average starting salary for MBA graduates in 2013 was $69,200 (NACE, 2013).

The IS student is largely satisfied with their job offers with an average satisfaction rating of 6.09 (scale of 1 – 7 with 7 being 'strongly agree'). 76% of the respondents scored their satisfaction at 6 or more.

The IS student is also confident that the demands and requirements of the job offers they are getting match their skills, abilities, and education. The average rating on job - fit was 6.1, and again about 76% rated at 6 or more.

The high ratings on satisfaction and job – fit suggest that the IS discipline is producing graduates who get good jobs, are satisfied with those jobs, and feel confident in their ability to perform well in those jobs.

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MALE MASTER PROGRAM STUDENTS MAKE MORE THAN FEMALES

STUDENTS FROM THE SOUTH GET THE BEST OFFERS

The average salary for Bachelor program students was virtually the same across gender. Male Master's program students, however, have a higher average salary of $68,866 vs. females $61,398. There were only minor differences among the regions with graduates from the South commanding the highest salaries of $67,937 (Master) and $58,696 (Bachelor).

Of the students who reported receiving offers, 33% of Master program students received an average signing bonus of $4,871, while 35% of Bachelor program students received an average signing bonus of $5,458. Master program students are most likely to receive bonuses in the IT industry which accounted for 38% of all bonuses and the Business Services/Consulting industry which accounted for 29%. Bachelor program students are most likely to receive a bonus in Business Services/Consulting – 31%, then Financial Services – 22%, and IT – 18% (see Appendix – Benefits and Bonus).

Of the students providing benefits data, the most frequently reported benefits include healthcare coverage and 401K retirement plans. It was surprising to see so many reporting remuneration of education and stock options given the current economic climate (see Appendix B).

Students from Bachelor programs primarily go into entry level jobs and then consulting positions. Surprisingly, a high percentage of Master's students also go into entry level positions.

Bachelor program students are spread out in a range of industries with IT, Financial Services, and Business Services / Consulting making up the bulk, and Master's students follow a similar pattern.

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IT, FINANCIAL SERVICES, & BUSINESS SERVICES / CONSULTING ARE THE TOP EMPLOYERS

According to NACE (NACE, 2013) the top industries for MIS Bachelor program graduates are: Professional, Scientific, and Technical Services, Federal, State, and Local Government, Finance and Insurance and Manufacturing. It is interesting to note that the NACE findings do not match the results in this report.

73% FOUND IT RELATED JOBS

73% of the students who reported receiving offers, found jobs related to IT, while the remainder received offers outside of IT. In comparison, 64% of overall college graduates expect to be employed, or are already employed, in their field of study (Accenture, 2013).

Of the students who reported receiving offers in IT, the majority were in systems analyst jobs. **The "other" job type was the second highest percentage suggesting that the classification scheme requires further refinement**[4].

SYSTEM ANALYST JOBS ARE THE MOST COMMON

[4] The job classifications in this report are based on the Bureau of Labor Statistics (BLS), "Standard Occupational Classification (SOC)," May 2011. Downloaded June 10, 2012.

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Graduation Date/Job Offer	January-12	May-12	August-12	January-13	May-13	August-13	January-14	May-14	January-15
no	11%	19%	57%	16%	22%	38%	41%	34%	47%
yes	89%	81%	43%	84%	78%	63%	59%	66%	53%

Note: Data was collected in April 2013 and it is likely that graduation dates prior or close to that are actual and dates in 2014 and later are estimates. The majority of the responses are clustered around the 2013 dates with the largest number graduating in May 2013 (740).

Department Size/Job Offer	Very Small	Small	Medium	Large
no	24%	17%	24%	30%
yes	76%	83%	76%	70%

Region/Job Offer	Northeast	Midwest	South	West
no	29%	27%	22%	24%
yes	71%	73%	78%	76%

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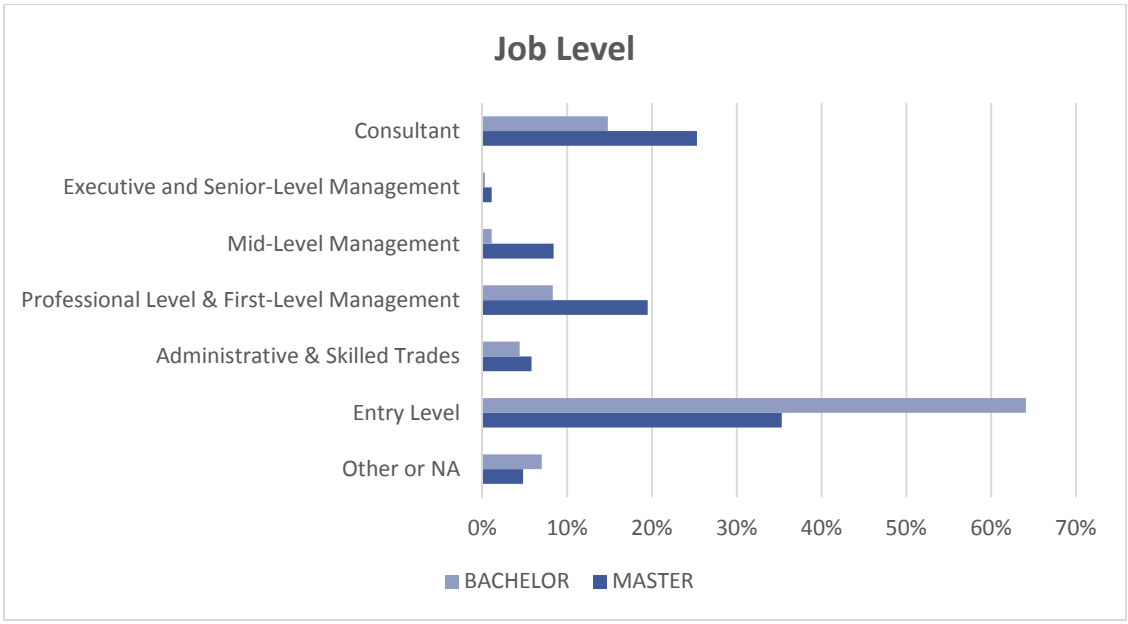

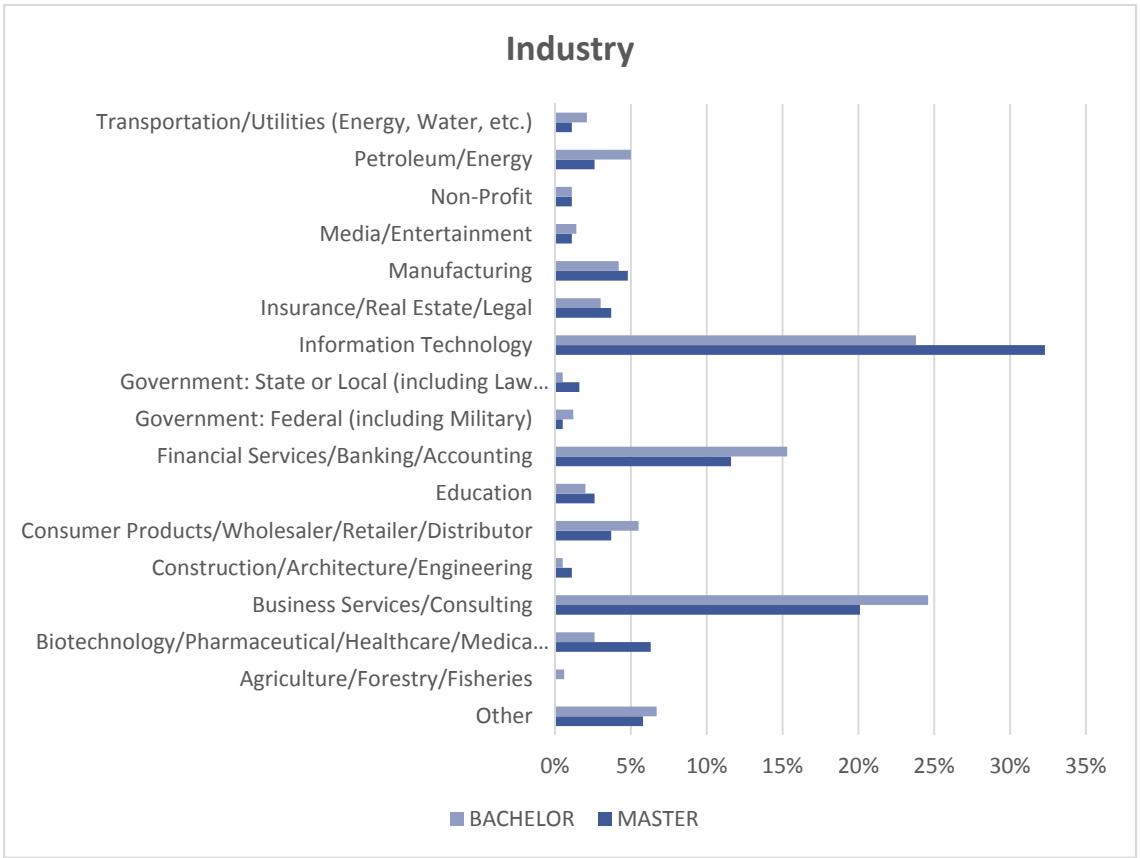

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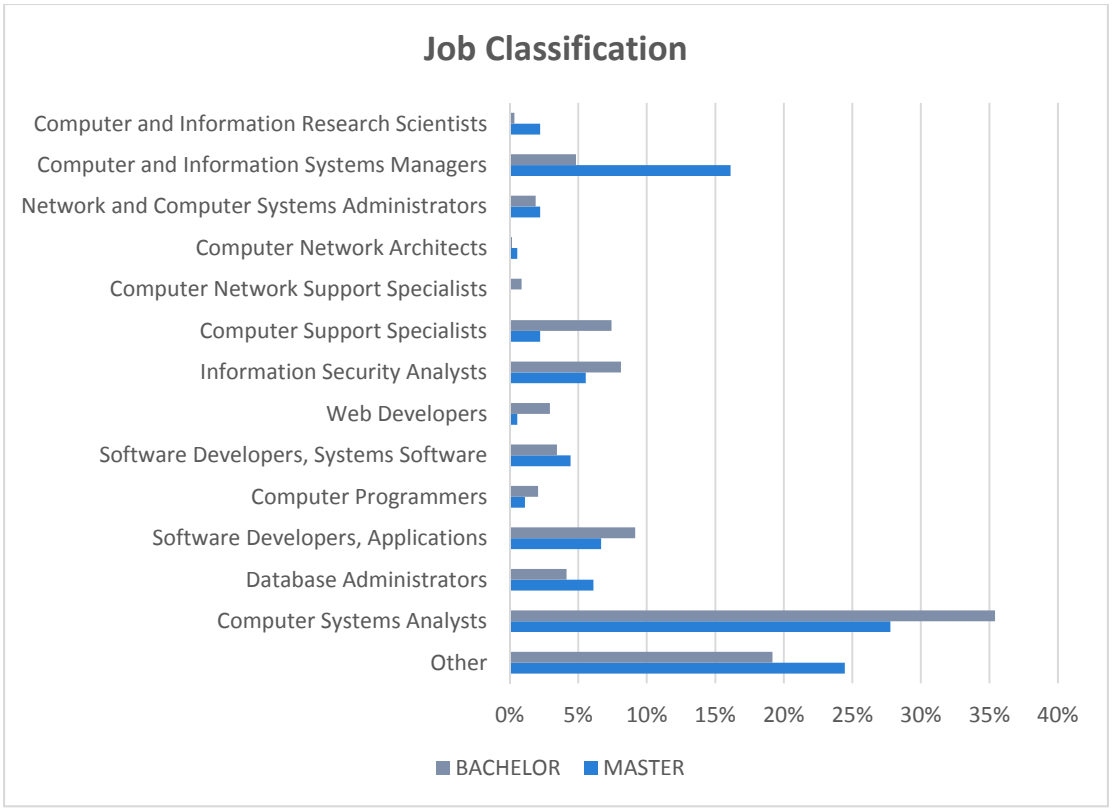

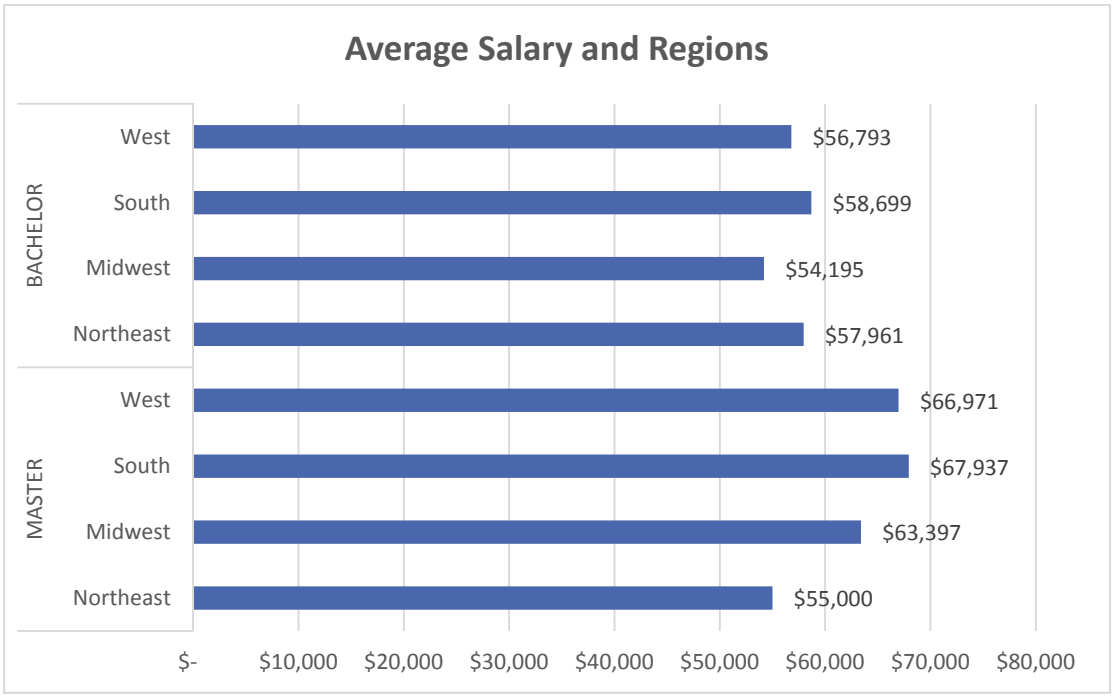

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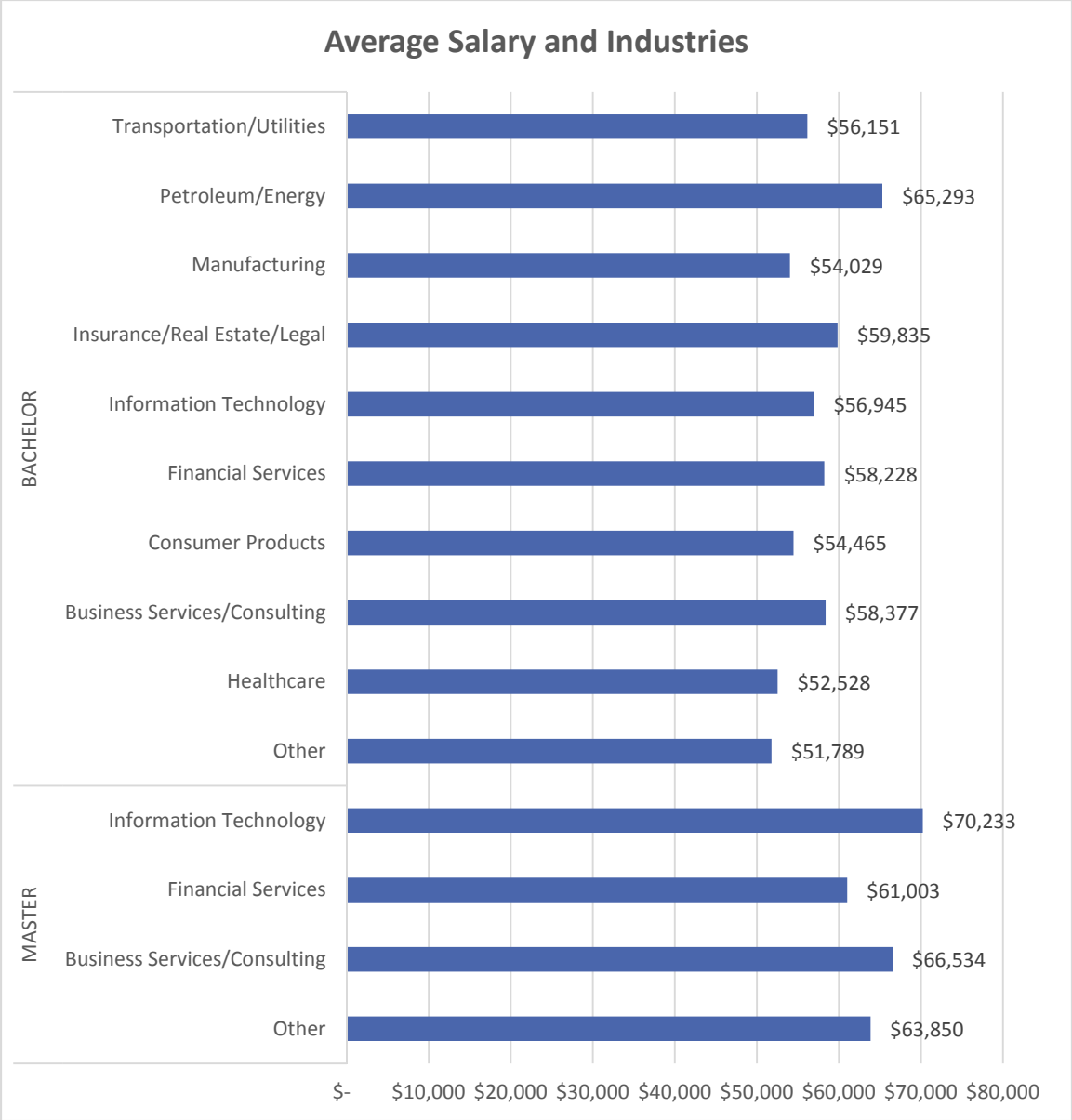

Note: Only industries in which the N was 10 or more are reported above.

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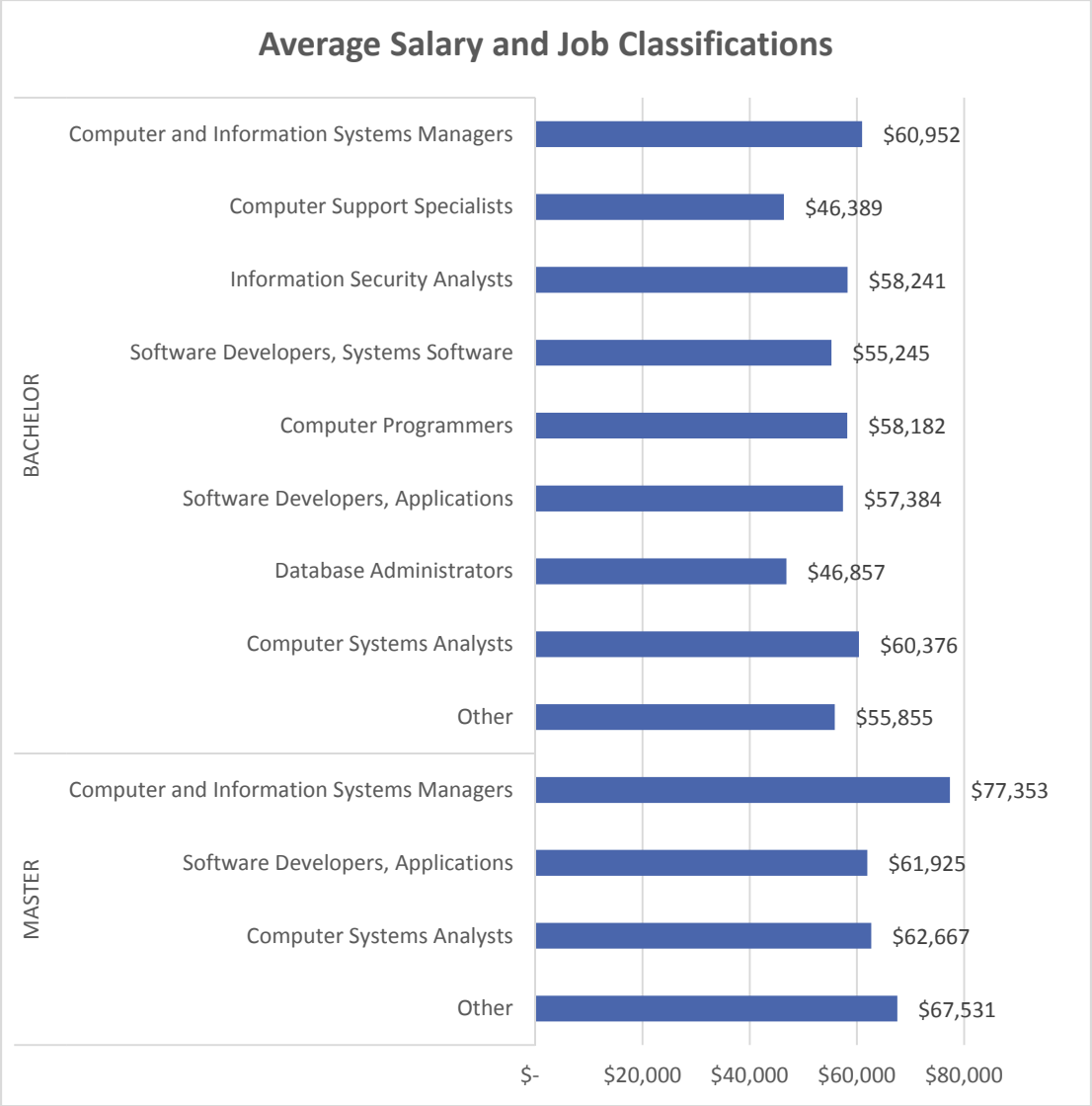

Note: Only job types in which the N was 10 or more are reported above.

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THE IS STUDENT JOB SEARCH PROCESS

IS students are industrious, confident and positive about the job search process. Master students apply for about 16 jobs on average, while Bachelor program students apply for about 11 (See Appendix C).

IS students are confident about the job search process with an average rating of 5.8 (on a scale of 1 to 7 with 7 being 'extremely confident') and have a somewhat positive attitude about the job search process with an average rating of 5.4 (on a scale of 1 to 7 with 7 as 'strongly positive'). Not surprisingly, students who did not receive job offers rated confidence at 5.1 and attitude lower at 4.5. Yet, these rating are still reasonably positive as 5 translates to 'slightly confident' on the confidence scale, and 'slightly positive' on the attitude scale.

BACHELOR PROGRAM STUDENTS APPLY TO 11 JOBS ON AVERAGE

The industriousness, confidence, and positive attitude was largely consistent across gender, degree program, and size of university and department. There were some differences across regions. Students from Northeastern schools are less positive and have less confidence about the job search process.

50% SPEND 20 OR MORE HOURS ON JOB SEARCH

About 50% spent 20 or more hours on the job search process in which a greater percentage of Master program students – about 60% spent 20 or more hours compared to Bachelor program students of which only about 46% spent 20 or more hours. In general, **students who spent more hours on the job search reaped greater rewards.** For example, of those Bachelor students who devoted 30 or more hours to job search activities, 30% received an offer

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and 11% did not receive an offer. Of those Master students who spent 30 or more hours, 47% received an offer and 36% did not receive an offer.

The job search activities revealed several interesting patterns. First, IS students apply multiple techniques frequently to the job search process including looking for jobs on job boards, talking to friends and contacts, formally applying for jobs, directly contacting employers, and interviewing. This suggests that **IS students are well trained in the job search process.** Second, the students who did not receive job offers spent a greater percentage of time looking for jobs than ones who did. This is not surprising in retrospect. Third, what is interesting is that of the ones who did get jobs across both Bachelor and Master students, a much greater percentage reported going for interviews on a frequent basis. This indicates the value of interviewing frequently.

Receive Offer?	Number of Job Applications	Attitude	Confidence
NO	12.6	4.5	5.1
YES	11.9	5.8	6.0
Total	12.1	5.4	5.8

Rating scale: 1 – 7, 7 = 'strongly positive'

Region	Number of Job Applications	Attitude	Confidence
Northeast	13.2	5.1	5.4
Midwest	9.9	5.5	5.8
South	12.4	5.6	5.9
West	13.2	5.4	5.8

Rating scale: 1 – 7, 7 = 'strongly positive'

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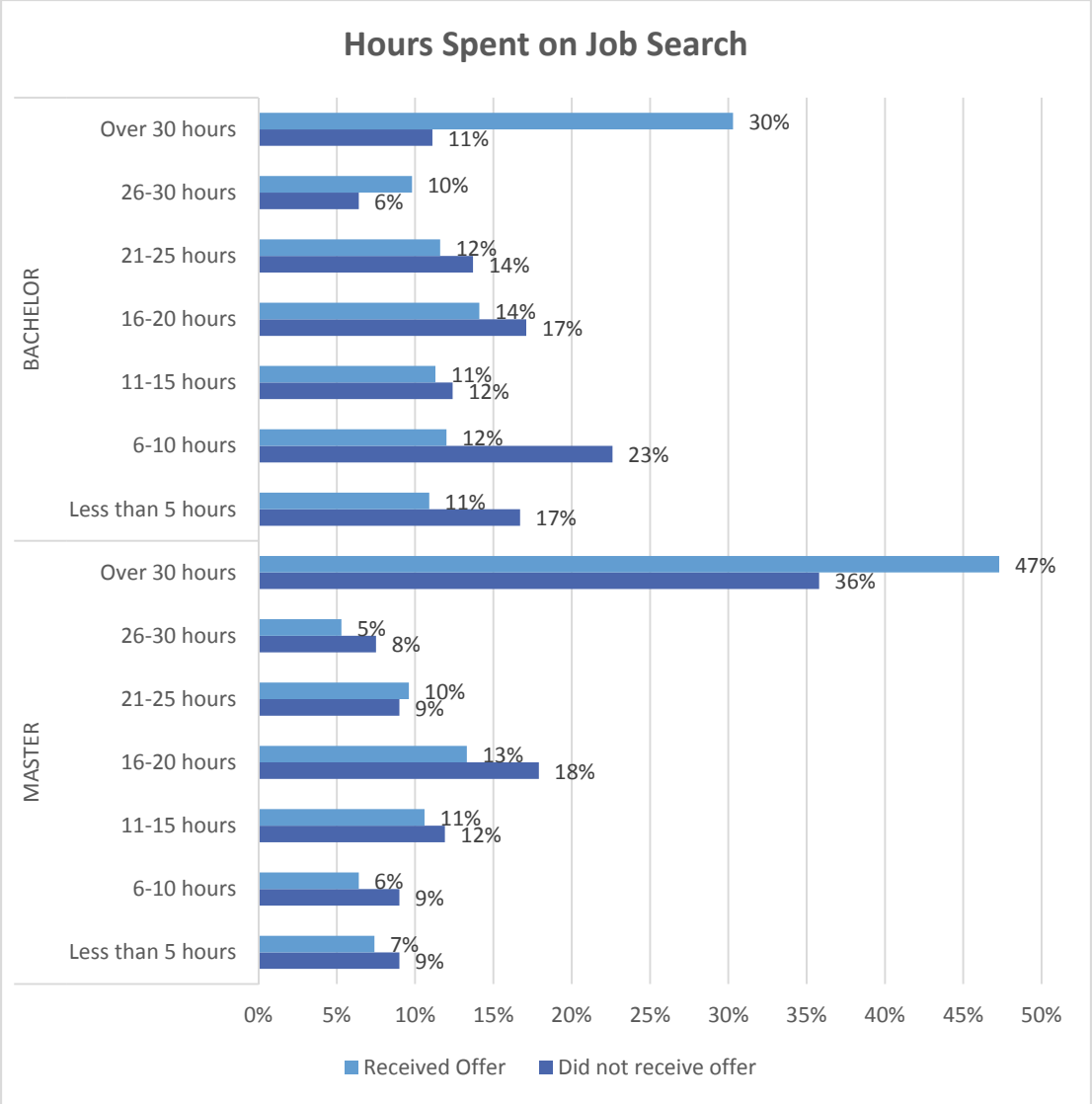

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	Look for jobs		Talk to friends and contacts		Send out resumes and applications		Contact employers		Interviews	
RECEIVE OFFER?	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
MASTER										
Never	2%	7%	2%	2%		1%	14%	5%	13%	2%
Very Rarely	2%	5%		6%		5%	8%	9%	8%	4%
Rarely	2%	5%	5%	4%	3%	3%	9%	8%	5%	4%
Occasionally	8%	15%	12%	13%	5%	9%	11%	17%	30%	9%
Sometimes	15%	14%	27%	20%	15%	14%	29%	24%	27%	29%
Often	48%	26%	32%	34%	39%	32%	23%	22%	15%	30%
Very Often	25%	27%	23%	22%	39%	37%	8%	16%	3%	23%
BACHELOR										
Never	4%	7%	2%	3%	0%	1%	7%	7%	12%	1%
Very Rarely	3%	4%	1%	3%	2%	3%	9%	6%	6%	3%
Rarely	4%	6%	6%	10%	3%	5%	14%	11%	16%	5%
Occasionally	14%	15%	16%	15%	10%	10%	24%	18%	18%	14%
Sometimes	20%	19%	24%	22%	17%	17%	23%	24%	24%	20%
Often	34%	26%	31%	27%	33%	31%	14%	21%	15%	32%
Very Often	21%	22%	19%	21%	34%	35%	9%	13%	9%	25%

Note: Read table starting with columns, for example, to analyze students who talk to friends and contacts about jobs, start at the top, from that group, there does not seem much difference in frequency of behavior and job offer success. Conversely, students who interview very often tend to get jobs.

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PROFESSIONAL DEVELOPMENT AND PLACEMENT RESOURCES

IS students have access to a large variety of professional and career development support resources including formal career services centers, student clubs, job databanks, career fairs, speakers, networking, and other services. Mentoring programs, e-portfolios, and resume books are less common.

Of the items included in our survey, employers consider career fairs (61%), information sessions (47%), resume referral (46%), and faculty connections (41%) as key tools in their recruiting (Career Services and the Collegiate Employment Research Institute, 2013).

Larger universities tend to have more resume books than medium sized universities, while the percentages are reversed for e-portfolios. In general, albeit by a small margin, medium sized universities tend to provide more support services than larger universities.

Looking at department size, smaller sized departments are least likely to have a resume book and mentoring programs, while size does not seem to play a role for e-portfolios. Given that e-portfolios are a relatively new innovation, their implementation may be idiosyncratic to particular universities and not a function of size. Resume books and mentoring require significant resources to produce and manage and it is possible that smaller sized departments lack the scale to implement such programs.

CAREER SERVICES CENTERS ARE IMPORTANT

There does not seem to be a relationship between availability of resources and the ability of students to receive offers. There is one major exception: 76% of the students

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at schools who reported having a formal Career Services center reported receiving offers compared to 47% that did not have access to such a service.

Overall, there does not seem to be an important resource differentiator that can influence the ability of students to get job offers. One important exception is a Career Services center.

Yet, it is also interesting that **IS students rated faculty higher for providing career related information, guidance, job search process support, and mentorship as compared to their local university career services center.** One possible explanation is that IS students benefit from the employer connections (e.g., job bank) that a Career Services center provides but prefer and value the services and guidance from faculty.

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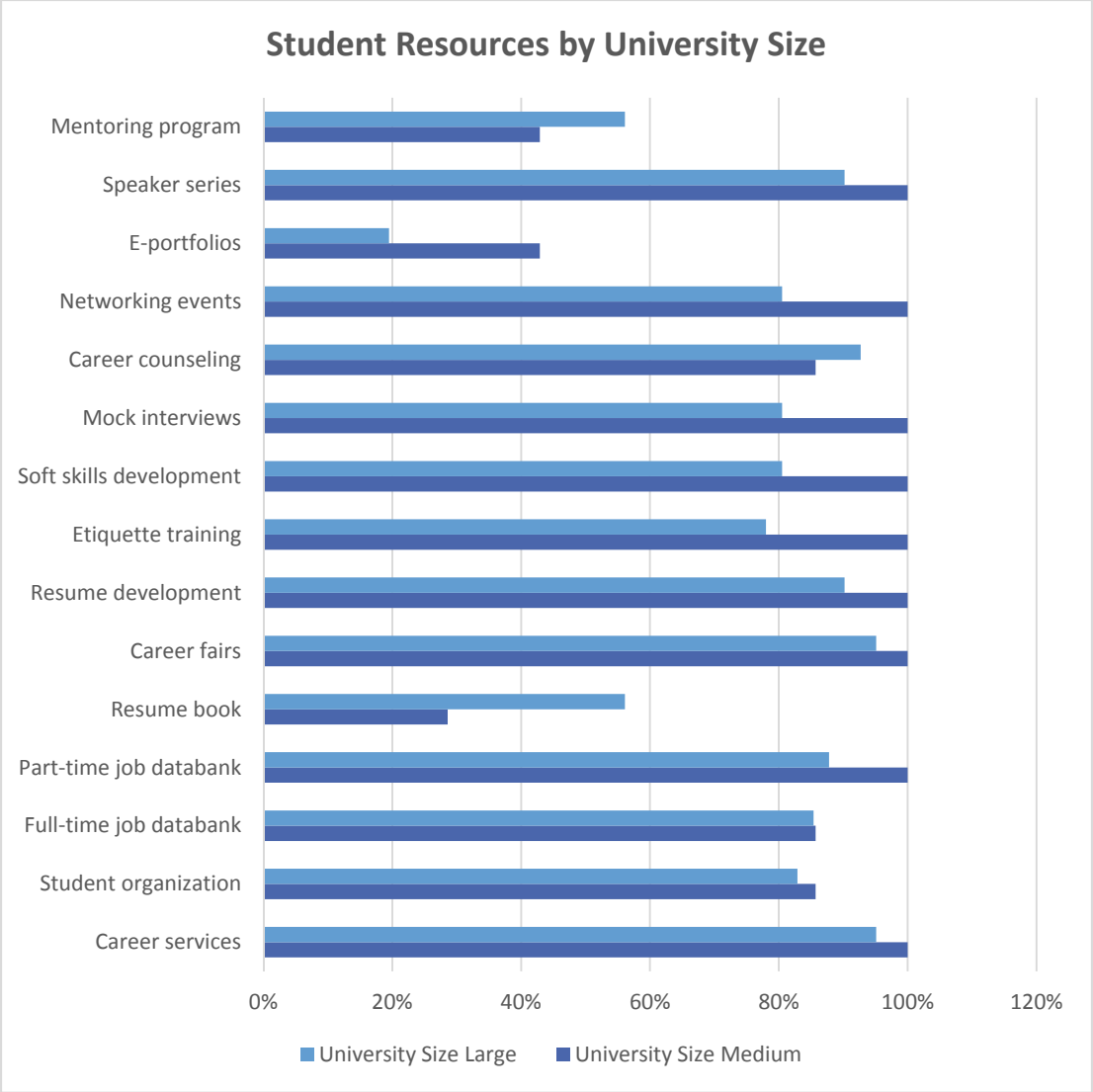

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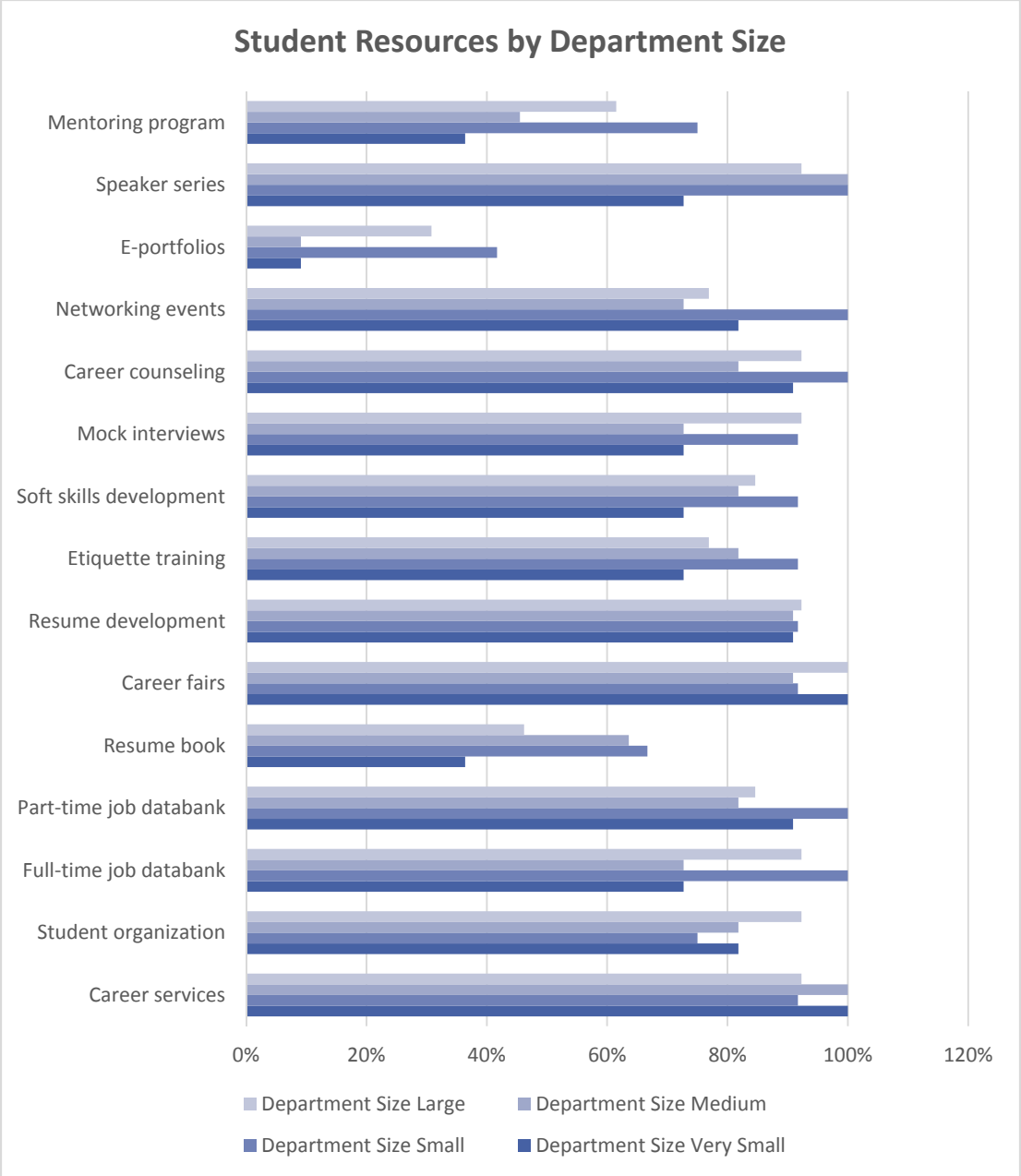

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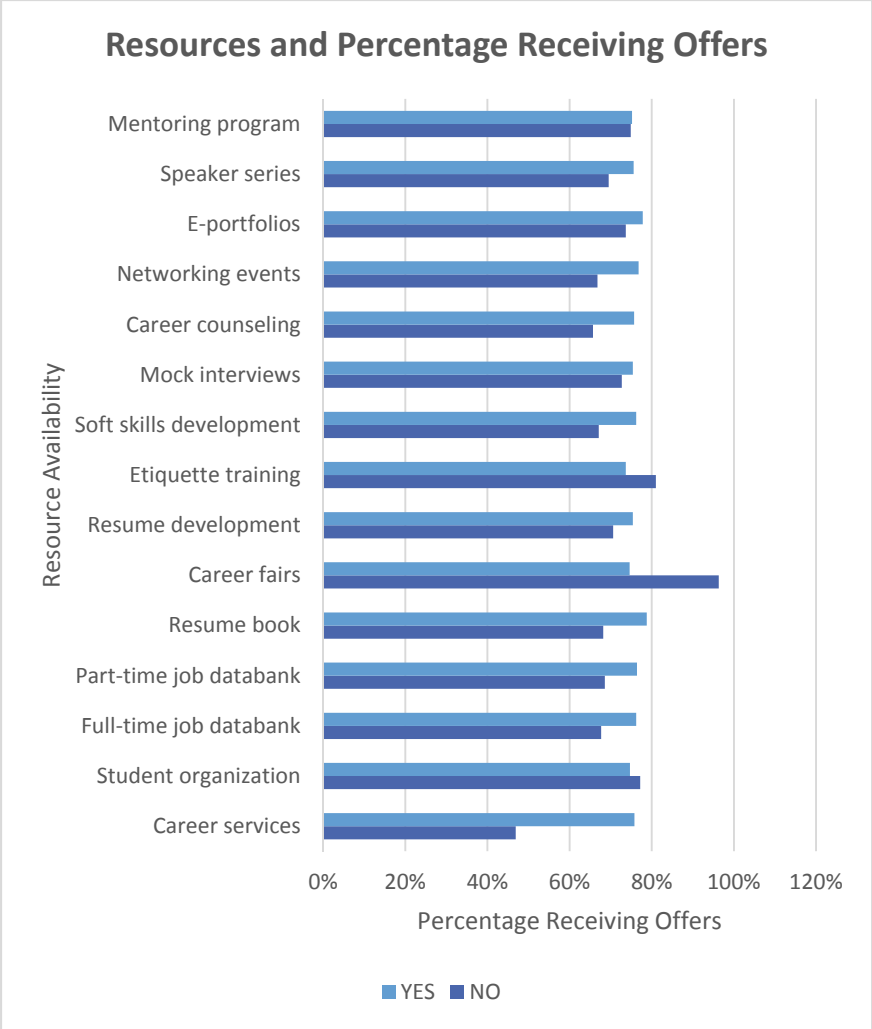

Note: Most schools reported having most of the resources. For example, only one school reported not having a career fair but almost all of their students received offers. Therefore, the graph should be interpreted with caution.

EVALUATION OF CAREER SERVICES AND FACULTY SUPPORT			
	Receive offer?	Career services support	Faculty support
MASTER	**NO**	4.7	5.2
	YES	5.3	5.7
BACHELOR	**NO**	4.9	5.2
	YES	5.3	5.9

Rating scale: 1 – 7, 7 = 'strongly agree'

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IS STUDENT KNOWLEDGE LEVELS

IS knowledge levels were assessed by students self-rating fifteen high-level capabilities identified in the IS 2010 Curriculum Guidelines. The capabilities are divided into three categories: high-level IS capabilities, foundational knowledge and skills, and domain fundamentals.[5]

Bachelor students rated knowledge of Communication, Leadership and Collaboration, and Analytical and Critical Thinking the highest with an average of 3.5 or more. **They rated their knowledge of Securing Data and Infrastructure the lowest at 2.4.**

BACHELOR STUDENTS RATE KNOWLEDGE OF COMMUNICATION, LEADERSHIP, AND ANALYTICAL THINKING THE HIGHEST

Master students rated knowledge of Communication, Analytical and Critical Thinking, and Understanding and Address Information Requirements the highest with an average of 3.7 or more. They also rated Securing Data and Infrastructure the lowest at 2.7.

Overall, students rated their knowledge at about the Concept/Use level (level 3) for most of the capabilities. This suggests that the IS student understands ALL the basic concepts in the discipline. However, this could be at the expense of more advanced capabilities or that students are unsure of their capabilities.

There were was no obvious relationship between self-rated knowledge and the ability to receive an offer. Note that the sample (see Appendix A) is focused on students who are in their terminal semester and are actively in the job market. These students are presumably going to receive their diploma and graduate. It is more likely that knowledge will play a role in the quality of the job and the student's long term career. Students who rated IS, foundational, and domain knowledge high do tend to receive higher salaries (though the margin is small).

[5] Based on Topi et al. (2010). See Appendix D for explanation of rating scale.

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KNOWLEDGE	CATEGORY	EXPLANATION / EXAMPLE
Improving Organizational Processes	IS	*process analysis, change management and project management*
Exploiting Opportunities Created by Technology Innovations	IS	*converting IT innovations into organizational value, analyzing problems and designing solution alternatives*
Understanding and Addressing Information Requirements	IS	*analyzing and documenting information requirements, utilizing and integrating data*
Designing and Managing Enterprise Architecture	IS	*representing and analyzing organizational business models, data, applications, and IT architecture, applying networking technology and data centers, and utilizing industry standard frameworks*
Identifying and Evaluating Solution and Sourcing Alternatives	IS	*generating high level design alternatives, identifying, sourcing, and acquiring operationally, financially, and technically feasible solutions, reusing or building on existing components, envisioning integrated systems*
Securing Data and Infrastructure	IS	*protecting high level data and infrastructure, identifying solutions to protect the organization*
Understanding, Managing and Controlling IT Risks	IS	*identifying, managing, and controlling IT related risks*
Leadership and Collaboration	F	*leading cross functional global teams, managing distributed / virtual work, working in diverse teams*
Communication	F	*analyzing archival materials, writing reports and presentations, using virtual collaboration/communication tools, giving presentations*
Negotiation	F	*negotiating with users about funding, resources of time, staff, and features, service levels, quality and performance deliverables, facilitating competing internal interests*
Analytical and Critical Thinking, including Creativity and Ethical Analysis	F	*ethical and legal implications of complex situations, quantitative techniques, innovation and creativity*
Mathematical Foundations	F	*statistics and probability, construct algorithms*
General Models of Business	D	*business process design, organizational theory, business models, strategy*
Business Functions	D	*finance, accounting, marketing, operations, behavior, business law*
Evaluation of Business Performance	D	*analysis of organizational, individual, and team performance, business analytics*

Legend: IS - high-level IS capability, F - foundational knowledge and skills, D - domain fundamentals.
Source: Based on Topi et al. (2010)

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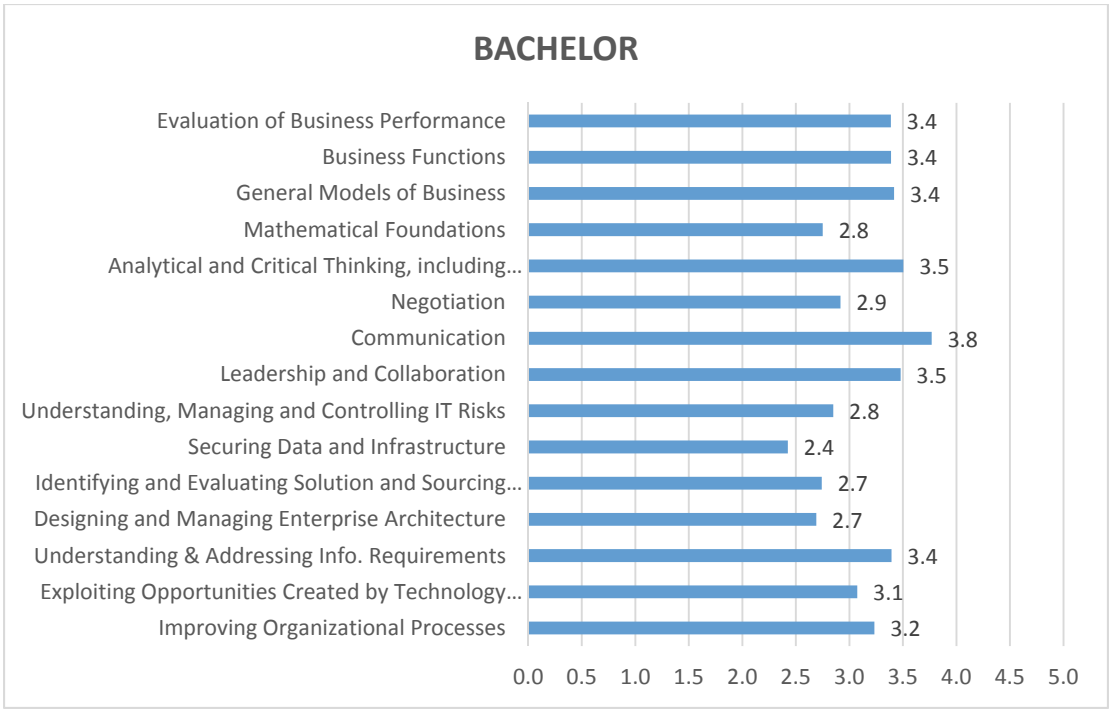

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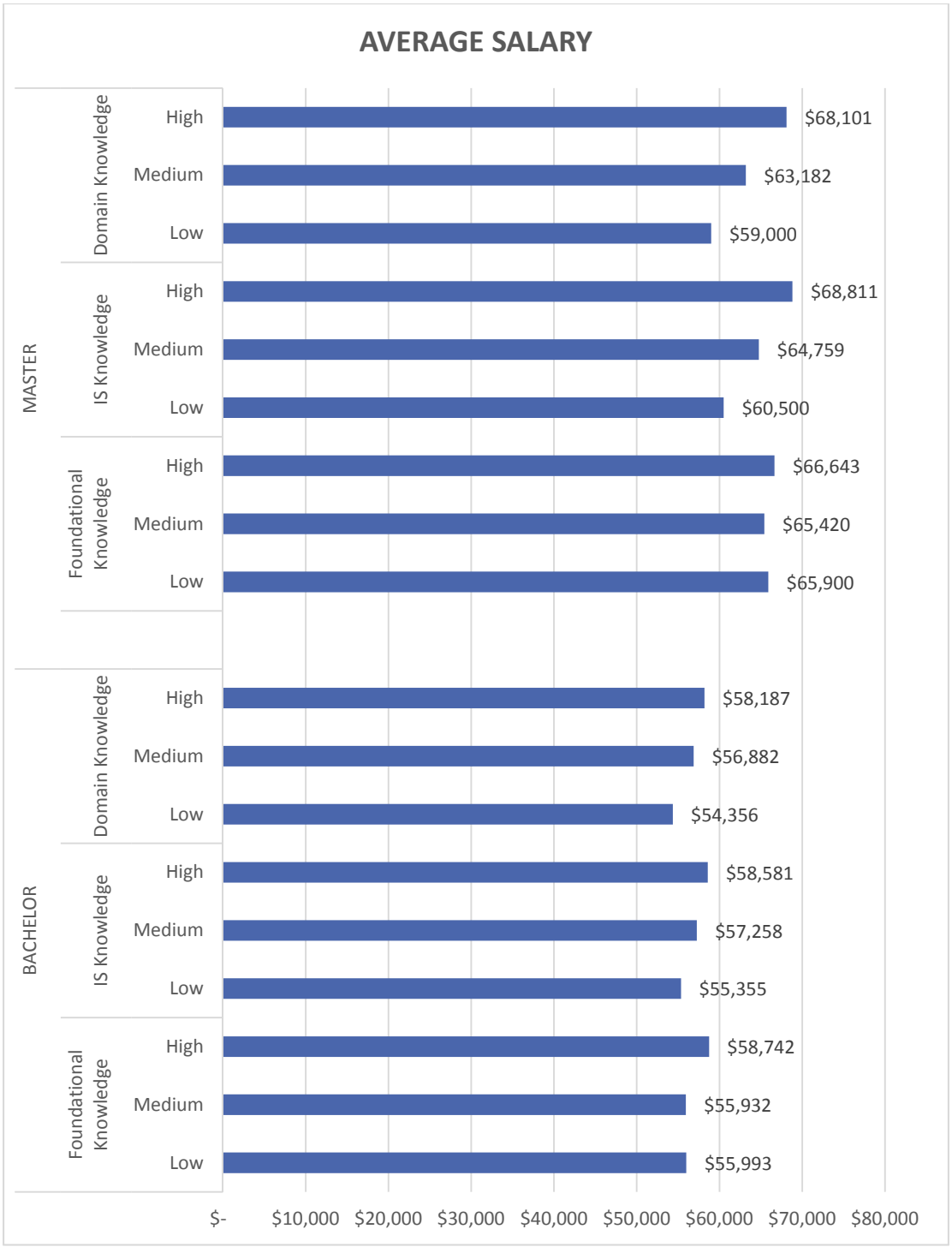

Scale: 5 point scale divided into Low: 0 – 1.66, Medium: 1.67 – 3.33, High: 3.34 – 5.00

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FINAL THOUGHTS

The IS industry has long been a pioneer in enabling businesses to execute and transform in a manner that is relevant and impactful. The demand for the IS student is projected to continue to increase in the feasible future. Yet, the nature of demand, demographics, job search process, growth industry, and appropriate knowledge continues to evolve and change.

The Association for Information Systems and Temple University, Fox School of Business, 2013 Information Systems Job Index Report is a first major step in providing prospective students, guidance counselors, high schools, current students, academics, and industry with a baseline analysis of the current state of the art.

The plan is to continue to publish the report on a regular basis and to create over time a repository that documents the evolution of IS careers and jobs. Future reports will include (a) expanded data collection with more schools, (b) longitudinal data analysis, (c) global focus, and (d) prioritized factors that top students look for in a company.

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MORE INFORMATION AND CONTACT

For more information about the AIS – Temple University Fox School 2013 IS Job Index, please review the following site http://ibit.temple.edu/isjobindex or contact Munir Mandviwalla at mandviwa@temple.edu or 215.204.8172.

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APPENDIX A - ABOUT THE SAMPLE

There were 1273 student responses from 48 universities in the United States. We also collected data from the chair or department coordinator in each of the 48 universities[6]. Participating universities were selected based on one or more of the following:

- Substantial IS centric major at the bachelor or master level
- U.S. News and World Report rankings
- Research ranking based on the AIS basket of journals
- AIS student chapter excellence

The responses were spread across the four major regions of the United States with a larger percentage from the South. 83% of institutions are public and large in size with 92% representing the 10,000 or more FTE level and 8% the medium 3000 - 10000 FTE level in total size. 47 of the 48 participating departments are in Business Schools, one is in a standalone Information School[7]. Overall, the 48 universities represent total Bachelor IS specific enrollment of 9,104 (average 179) and 3,562 (average 59) Master students. Of the 48 institutions, all have Bachelor programs, 42 have Master students, and 28 have a doctoral program.

41% of the participants departments are large in size with more than 337 FTE students with only 12% coming in at very small[8]. About 60% are free standing focusing only on information systems, while the remainder are integrated with other disciplines (e.g., Operations, Management). About 70% of the respondents are Bachelor students (e.g., Bachelor of Science, Bachelor of Business), while the remaining 30% are Master students (e.g., Master of Science).

In the 48 universities, the number of students who are in their final semester and/or have recently graduated total 2,850 from Bachelor programs and 1,523 from Master programs[9] resulting in a 29% estimated response rate. From this data, we estimate

[6] The original pool included fifty universities. Two were dropped because we did not get sufficient response. Students from twelve additional universities also submitted data, however we had to drop their responses as we did not receive corresponding chair level data. Five student responses were dropped because they included spurious data. One university had 3 different departments that participated in the study.
[7] Six students in one of the business schools reported that they were in a Computer Science program.
[8] Department size categorization is based on dividing FTE enrollment data into four quartiles.
[9] Estimate provided by department chairs.

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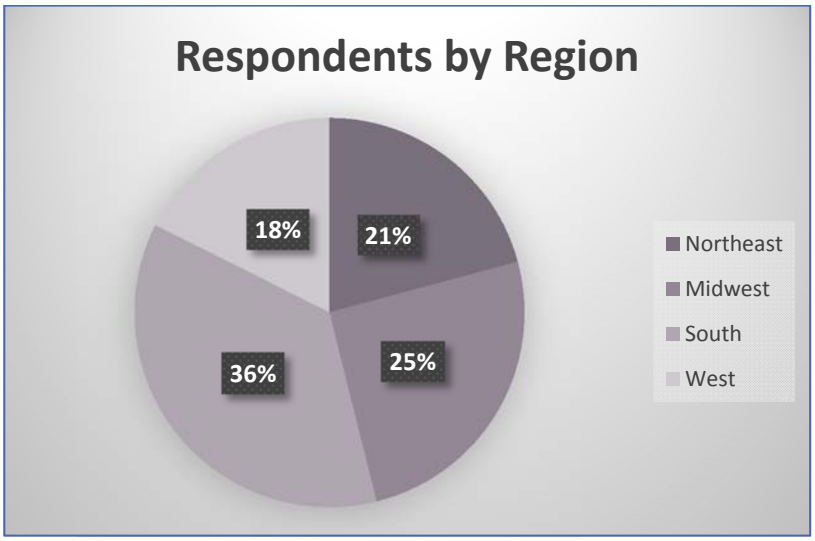
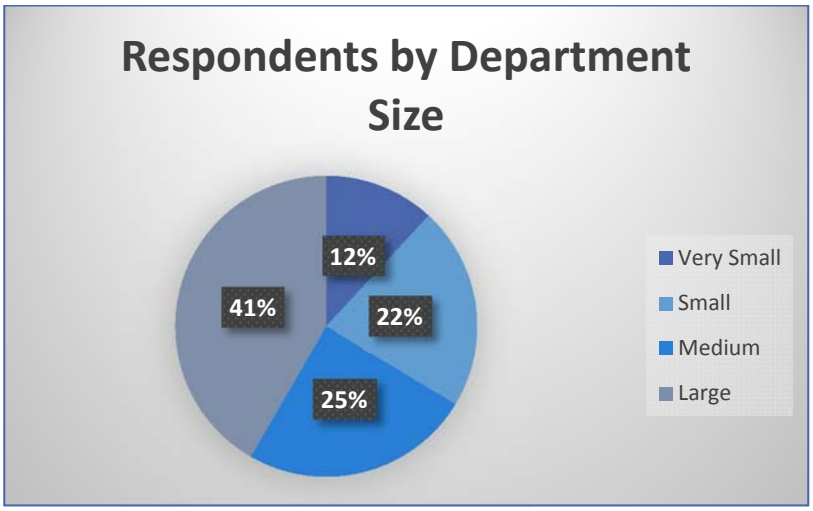
average graduating size of each department as 56 Bachelor and 35 Master students. There are an estimated 1300 IS programs in the United States[10]. Therefore, we estimate the total size of the pool of graduates from IS programs in the job market in 2013 in the U.S. to be about 72,000 (Bachelor program).





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[10] Estimated from Collegeboard.org.

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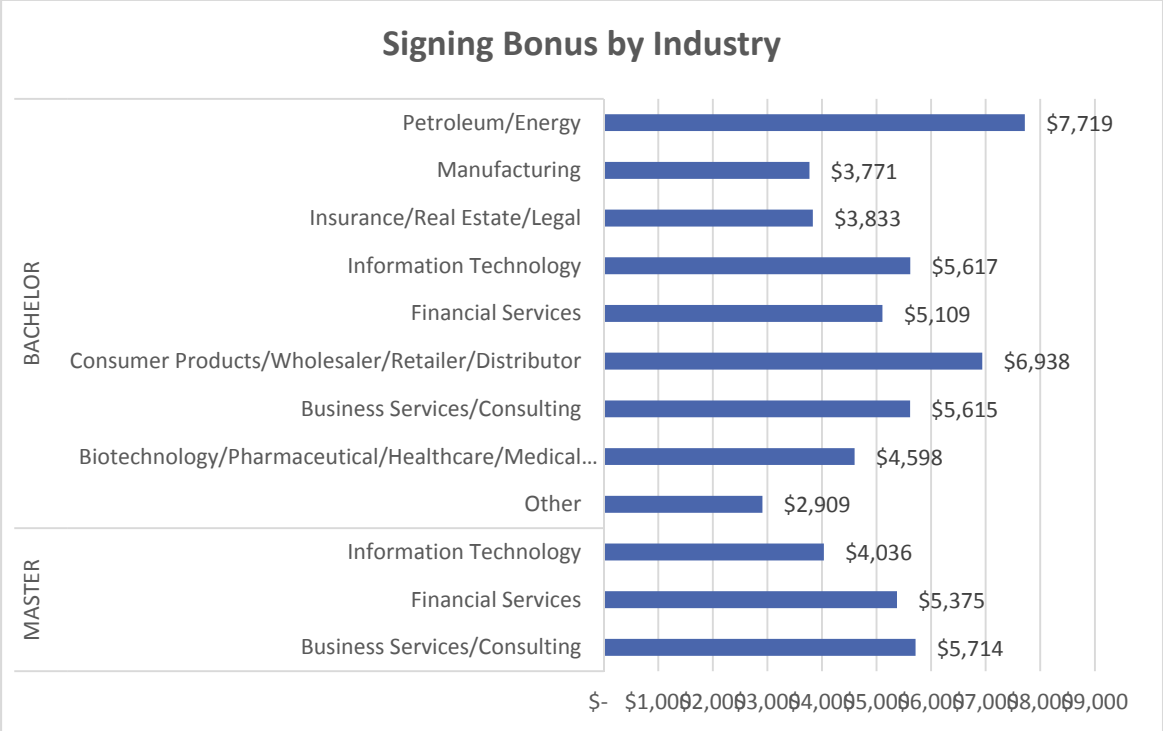
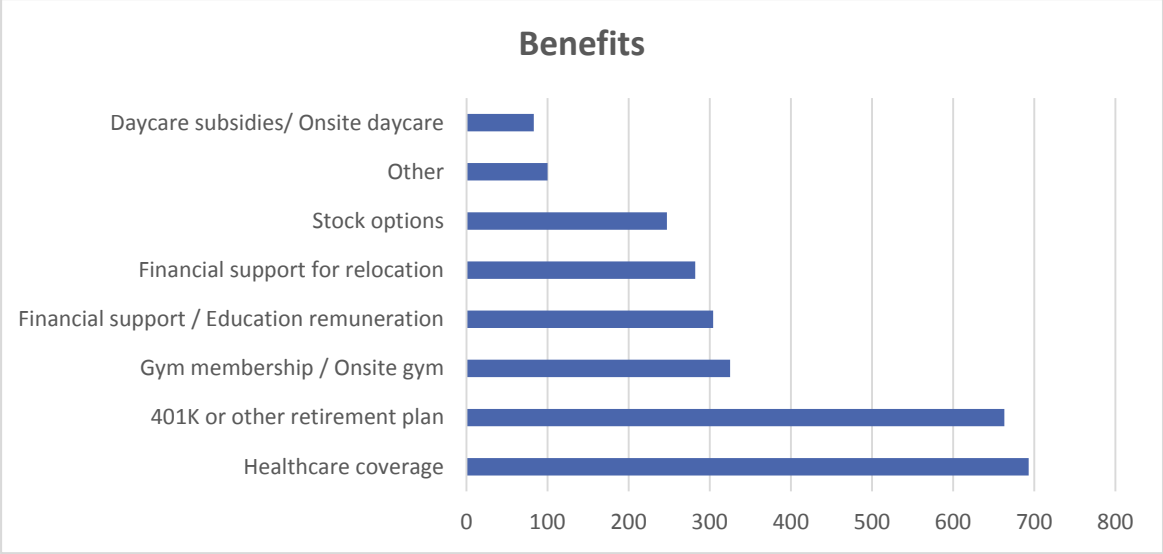
APPENDIX B – BONUS AND BENEFITS



Note: Only includes N=5 or greater



Scale: Number of students reporting the benefit.

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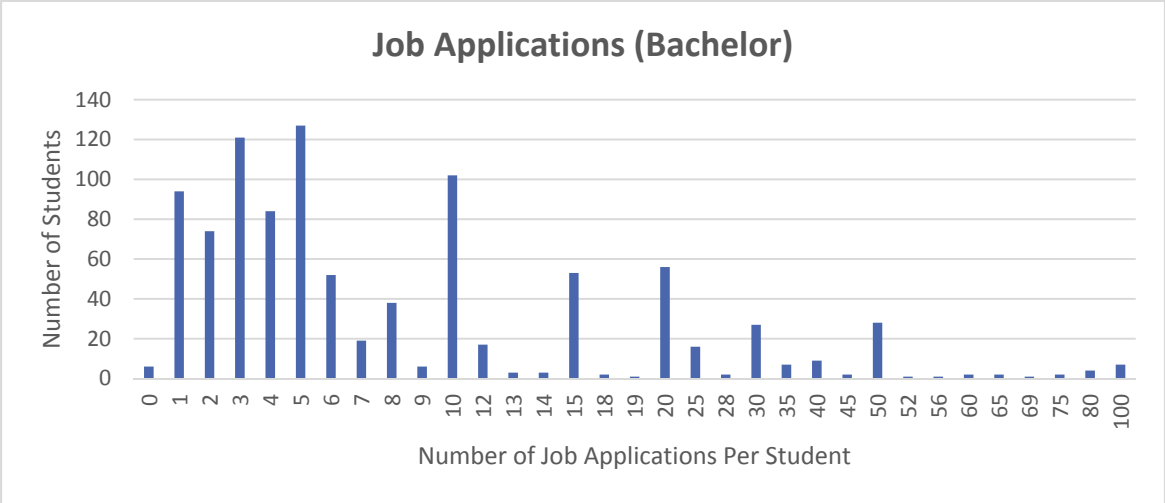
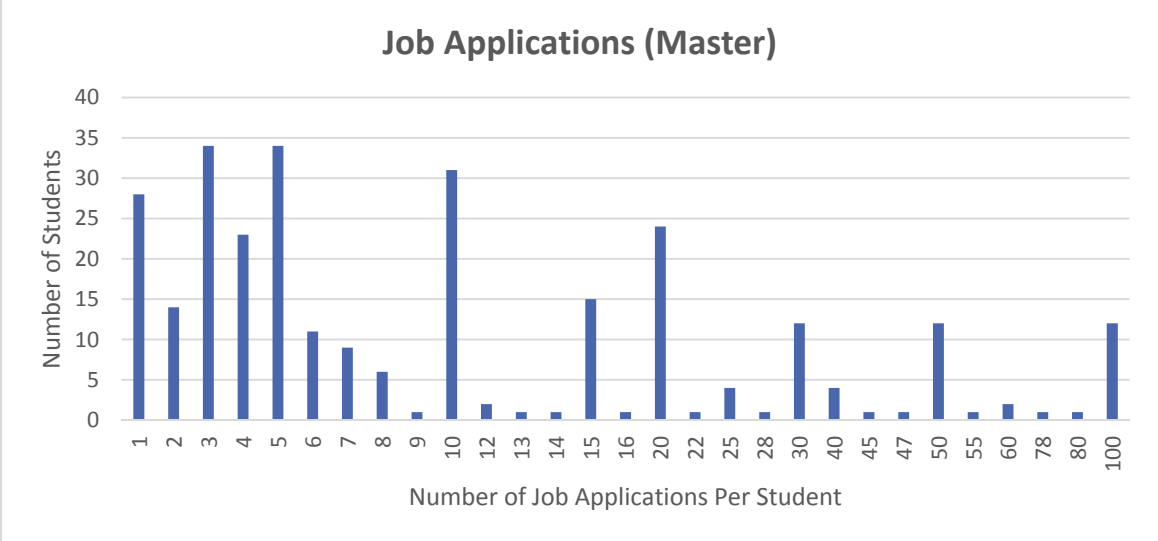
APPENDIX C – JOB APPLICATIONS





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APPENDIX D – KNOWLEDGE SCALE

IS 2010 SCALE	BLOOM LEVELS OF KNOWLEDGE
0 No Knowledge	
1 Awareness	1 Knowledge Recognition
2 Literacy	1 Differentiation in context
3 Concept/Use	2 Comprehension Translation/Extrapolation Use of Knowledge
4 Detailed Understanding, Application Ability	3 Application Knowledge
5 Advanced	4 Analysis 5 Synthesis 6 Evaluation

Source: Topi et al. (2010)

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