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## A LinkedIn Analysis of Career Paths of Information Systems Alumni

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# A LINKEDIN ANALYSIS OF CAREER PATHS OF INFORMATION SYSTEMS ALUMNI

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## ABSTRACT

Information harvested from the LinkedIn profiles for 175 graduates of an Information Systems program at a mid-sized comprehensive university in the southeastern USA are summarized in this investigation. The current investigation was undertaken to examine the extent to which LinkedIn profiles are able to provide a more realistic picture of entry-level jobs held by program alumni and subsequent career progress. Additionally, our results suggest that LinkedIn profiles can help answer questions such as: what jobs do IS graduates get, what does the career of an IS professional typically look like, and can IS graduates successfully transition from technical to managerial positions? Our findings also suggest that information in LinkedIn profiles can be used to assess the long-term outcomes of IS programs.

## Keywords

Web 2.0, IS career paths, IS recruitment, employment churn

## INTRODUCTION

Web 2.0 is the term given to describe a second generation of the World Wide Web that is focused on the ability for people to collaborate and share information online, including social networking and user-generated content. Web 2.0 is increasingly being used by IS educators to enhance student learning experiences. As noted by Richardson (2006) and Solomon and Schrum (2007), the number of educators using blogs, wikis, podcasts, Facebook, Flickr, MySpace and other Web 2.0 technologies continues to climb.

Social networking and the ability to harness network intelligence are common themes across Web 2.0 technologies. Schuen (2007) notes that LinkedIn is a Web 2.0 benchmark for business networking. Although Facebook and Plaxo offer comparable social networking capabilities for business professionals, neither has experienced LinkedIn's rapid growth in usage by business professionals. LinkedIn is the world's largest professional network with over 120 million members and growing rapidly. LinkedIn connects users to trusted contacts and helps them exchange knowledge, ideas, and opportunities with a broader network of professionals (What is LinkedIn?, 2012).

After creating a LinkedIn account, members can create a professional profile that includes a photo (optional), education and career history, and professional affiliations. Members can also connect/link to other LinkedIn members, thus expanding the network to members of members. Hence, once a profile is created, LinkedIn members can invite others to 'link' to them, accept 'link' invitations initiated by others, join groups (corporate, conference, networking, industry, professional, alumni, etc.), and establish new groups.

Reflecting on his personal use of LinkedIn, Douglis (2010) identifies three important roles: as a recipient of an inquiry (e.g., from a job hunter), as an intermediary (e.g., passing messages along my network on

behalf of friends), and as a job hunter (e.g., seeking employment). In terms of using LinkedIn for recruitment, Hempel (2010) goes as far as stating, “If you don't have a profile on LinkedIn, you're nowhere.” Additionally, Schuen (2007) considers LinkedIn to be especially valuable to salespeople seeking contacts with potential clients. In this regard, a key factor feature of using LinkedIn is the ability to find other members. It therefore is not surprising that LinkedIn has been actively updating its search technology, with release of a major revision to their search platform in 2008 (Kozak, 2008). Moreover, this search platform was extended in late 2009 to allow for ‘faceted’ search (enabling members to create dynamic filters), and a corresponding launch of a premium search service (Kozak, 2009). LinkedIn has also been actively developing a programming API that can be used by independent developers to develop their own LinkedIn-connected applications.

As a dataset, the LinkedIn database is a valuable information repository. In this regard, LinkedIn has established an ‘analytics team’ of ‘LinkedIn data scientists’ with a view to mine the data to produce interesting and valuable insights, as well as develop new services. In this respect, the LinkedIn blog (<http://blog.linkedin.com/>) has detailed some of the results to date, such as what terms are potentially overused in LinkedIn profiles (Sharma, 2010). An example of a new services arising from the data mining initiative is LinkedIn’s proposed *Career Explorer*, which is a tool aimed at college students to help them “build their careers” (Watters, 2010). Recognizing the value of the LinkedIn dataset, this study sought to perform an exploratory study of the LinkedIn data posted by alumni of an Information Systems program at a mid-sized comprehensive university in Southeastern USA. In particular, the goal of the study was to identify the entry-level jobs held by program alumni, and to develop an understanding of their subsequent career progress.

## LITERATURE REVIEW

This study is positioned in the stream of research exploring the knowledge, skills, and abilities (KSA) and the career paths of IS/IT professionals. The KSA area is one of the more robust research topics with respect to the IS/IT workforce. Much of the work is primarily concerned with identifying a comprehensive list of KSAs needed by IS/IT professionals and evaluating which of those KSAs are most important. The consensus from these studies identifies business/managerial skills (such as communication, teamwork, interpersonal skills, and business knowledge) as more important than technical skills (such as programming, networking knowledge, or database skills). This is not to say that such technical skills are unimportant for IS/IT professionals; strong technical skills are essential (Joseph, Joseph, Ang, Chang and Slaughter, 2010). However, the findings from this research stream suggest that IS/IT professionals are viewed as employees and service providers first and as technicians second. The stakeholders queried in these studies include IS and non-IS managers (Lee, Trauth and Farwell, 1995; Gallagher, Kaiser, Simon, Beath and Goles, 2010), IS academics (Lee, Koh, Yen and Tang, 2002), IS recruiters (Fang, Lee and Koh, 2005), and IS/IT professionals themselves (Khan and Kukalis, 1990; Sawyer, Eschenfelder, Diekema and McClure, 1998; Bailey and Stefaniak, 1999; Koh, Lee, Yen and Havelka, 2004). These stakeholders overwhelmingly identified the paramount importance of business/managerial skills over technical skills.

Research into the career paths of IS/IT professionals is more sparse than that investigating KSAs. We can glean some insight into career paths by reviewing the research investigating KSAs of IS/IT professionals at different stages in their career paths. Studies investigating the KSAs of entry-level employees are more likely to emphasize the importance of technical skills for new hires (Abraham, Beath, Bullen, Gallagher, Goles, Kaiser and Simon, 2006; Goles, Hawk and Kaiser, 2008). However, business/managerial skills are also valued in entry-level IS/IT professionals (Trauth, Farwell and Lee, 1993; Fang et al. , 2005). Studies specifically investigating mid-level employees identify project planning, budgeting, and scheduling skills as most important (Abraham et al. 2006; Gallagher et al. , 2010). Those investigating the skills of IS/IT managers identify managerial skills as most important (Lee and Lee, 2006). The picture developed from integrating across this literature is an early emphasis on technical skills as IS/IT professionals begin their careers with a gradual transition to greater emphasis on business/managerial skills as their career

progress. This picture is confirmed by research specifically investigating IS/IT professional career paths. A case study exploring the role of politics in IS/IT careers recommended that IS/IT professionals can enhance their career and increase promotion opportunities by working to develop interpersonal and communication skills (Standing and Standing, 1999). A review of job advertisements by Fortune 500 companies finds that ads for positions later in the IS/IT career path are more likely to specify a need for communication and interpersonal skills (Lee and Wingreen, 2010). In this study, we seek to add to this body of knowledge by exploring a relatively untapped source of insight into career paths of IS/IT professionals; their social media profiles.

## METHOD

LinkedIn and Plaxo groups for IS program alumni were created in late June 2008. Within a week of its creation, the chair of the IS program utilized the university's alumni databases to identify the names of program alumni ( $n > 1,200$ ) and subsequently used LinkedIn's *People Search* function to determine whether each alumnus had created a LinkedIn profile. Program alumni who could be firmly identified (by referring to the university and college and/or major in the Education section of their profiles) were sent invitations to link/connect that also included a request to join the LinkedIn group for program alumni. Approximately 120 alumni accepted the invitation to link and join the group and approximately 55 more accepted the invitation to link/connect, but did not join the alumni group.

The alumni search and invitation process typically transpired in the following fashion. The IS Chair would log into an in-house open source application called *Alumni Tracker* which had been populated with data about alumni who had received IS degrees. The data it contained was provided by the university alumni association. The intent of the *Alumni Tracker* application was to provide a Web interface for alumni to update their contact and career information and to search for fellow alumni. However, because it was rarely used and the majority of the data it contained was outdated, it was only used in this investigation as more than a repository of IS alumni names organized by graduation year.

Over a period of several weeks, the IS Chair logged onto *Alumni Tracker* and accessed the alphabetical ordered list of names of IS alumni who graduated in a specific year, beginning in 1984. The IS Chair also logged on to LinkedIn and systematically entered each name into the *People Search* function to begin the process of determining whether the alumnus had a LinkedIn profile that could be found. In most cases, the name search resulted in multiple hits, but in some instances no matches for the entered name were found. A search that produced multiple matches required the additional steps of examining the individual profiles to look for other evidence that it was that of an IS graduate from the university. In most instances, only the *Education* section of the profile needed to be examined. If the university was not included in the *Education* section the profile was not further examined. Only individuals with LinkedIn profiles with matching university, years of attendance, and other evidence (such as major or college, if listed, location, industry, or work history) were sent invitations to connect. If there was any uncertainty about the individual's status as an alumnus, he/she was not sent an invitation.

The connection message was typically the standard "I'd like to add you to my professional network on LinkedIn" with an additional message: "Please join the LinkedIn group named xxxx." Occasionally, the IS Chair also included an additional personalized message when there was a high degree of certainty that the individual was a former student encouraging them to let other IS alumni know about the group. As manager of the LinkedIn group, the IS Chair added individuals who responded to the invitation to join the group. During this membership solicitation period, the IS Chair checked the group daily for individuals seeking to join the group.

The time-consuming nature of the search-identify-invite process meant that on most days, no more than 50 IS alumni names were checked. Because the number of IS graduates varied by year (from a high of 90 to a low of 16 with an average of 44), for most days only the names of graduates for a specific year were searched. However, for some days the graduates for two years were checked, while for other days approximately half of the names of graduates for a given year were investigated.

After going through the entire list of names in the *Alumni Tracker* repository, the IS Chair searched for the names of several known alumni who graduated prior to 1984. The profiles of several users were identified and these individuals were sent messages inviting them to connect and to join the LinkedIn group.

The search-identify-invite process resulted in approximately 220 invitations being sent to individuals determined to have a high probability of being an IS alumnus. But, sufficiently positive identifications could only be made for about 18 percent of the individuals included in the *Alumni Tracker* database. No LinkedIn name matches were found for about 10 percent of the names in the database and the assumption was made that these individuals did not have LinkedIn profiles. About 20% of the individuals without LinkedIn profiles were younger alumni who were members of a Facebook group for IS majors at the university.

Approximately 75% of those individuals receiving invitations accepted the IS Chair's invitation to connect and/or join the group. Almost 55% of the invited chose to both connect and join the group, while another 25% of those invited chose to connect to the IS Chair, but did not seek membership in the group.

In general, alumni that had been graduated the longest, and had gravitated to senior level positions, were more likely to accept the invitation to connect, but did not join the group. Alumni that graduated in the same time frame but were in mid-level positions were more likely to both connect and join the group. Alumni that graduated prior to 1990 and those graduating between 2000 and 2005 responded most quickly to their invitations. Invited alums that graduated during the 1990s were among the slowest to respond.

The profiles of alumni who accepted the IS Chair's invitation to connect but who refrained from joining the group were further scrutinized. Specifically, their *Connections* were examined for additional alumni missed in the initial search-identify-invite process. Several more alumni were positively identified and were sent invitations to connect and join the group.

The process used to establish connections with alumni with identifiable LinkedIn profiles was time-consuming and cannot be assumed to have captured all program alumni with LinkedIn profiles. There are undoubtedly LinkedIn profiles for a much larger set of alumnae whose married name did not match their maiden name that was included in the university's alumni database. It should be noted that the maiden name was included in the database for any alumnae who did not voluntarily update her contact information. Other program alumni whose names matched those in the database with abbreviated LinkedIn profiles were not sent invitations to connect/link or join the group. Regarding the *Education* section of the LinkedIn profile, if the alumnus failed to identify the university/college/major, and graduation year (matching that in the database), a firm determination of the individual's status as a program alumnus could not be made.

In December 2008, the following information was harvested from the LinkedIn profiles of the set of IS program alumni who had accepted invitations to link/connect and/or joined the LinkedIn alumni group for program graduates:

- Graduation year
- Gender
- Additional education
- Job title for first job after graduation and first employer
- Job title and employer for job held five years after graduation
- Job title and employer for job held ten years after graduation
- Job title and employer for job held fifteen years after graduation
- Current job title and employer

The set of LinkedIn profiles examined varied in terms of completeness and richness. In numerous instances, especially for program alumni who were 10+ years into their professional careers, entry-level

employment data was sketchy or non-existent. The profiles for numerous program alumni only included information on positions held ten or five years after graduation, and in some instances only included the current job title and employer of the alumnus. Descriptions of positions held also varied in richness. In some profiles, the description provides a relatively detailed picture of job responsibilities, platforms, development environments/tools, etc., but most were limited to one or two line summaries, or just job titles. To the extent possible, position descriptions were used to classify the jobs as either technical or business/managerial. In a few cases, it was necessary to make that classification based solely on the job title.

Despite these limitations, the harvested information about first job and employer provided an indication of the jobs that program alums find immediately after graduation, as well as information about jobs held five, ten, and 15 years after graduation. As such, the information provided insight into the nature of career progress.

## RESULTS

A total of 175 IS alumni profiles were harvested from the LinkedIn group and personal connections. The median graduation year was 1999 and ranged from 1982 to 2008. Ninety alumni with LinkedIn profiles graduated before 2000, and 85 alumni graduated from 2000 to 2008. There were significantly more male alumni with LinkedIn profiles ( $n=138$ ; 79%) than female ( $n=37$ ; 21%). This percentage is consistent with current statistics regarding the number of women earning degrees in computing disciplines nationwide. According to the National Center for Women & Information Technology (<http://www.ncwit.org/about.factsheet.html>), women earned 18% of the undergraduate degrees in computing and information sciences awarded in 2009, down from 37% in 1985. Literature examining the IT workforce has reported comparable percentages. For example, the sample used by Lo and Riemenschneider (2011) was 73% male and 27% female. Rutner, et al. (2011) reported a sample which was 64% male and 36% female. However, when we compare the proportions in this sample of profiles with that of graduates from our program, it is apparent that females are underrepresented. Since the inception of our program, the gender breakdown of graduates has been 62% male, 38% female. As we noted in the Methods section above, it was more difficult to identify female graduates who are now using their married names instead of maiden names.

### Educational Attainment

Most alumni profiles (78%) indicated that the B.B.A. in Information Systems was the highest level of education that was achieved. Twenty-two percent ( $n=38$ ) completed at least a master's degree, with three alumni completing a Ph.D. in Information Systems and currently hold teaching positions. The vast majority (24 of 38, 63%) of alumni holding masters degrees had completed an MBA. Masters degrees were relatively evenly distributed across profiles: the percentage of profiles indicating a master's degree were 23.2 % for the first job group, 23.2% for the 5-year group, 16.2% for the 10-year group, and 17.6 % for the 15-year group. A chi squared difference test comparing these proportions was not significant (chi squared = 1.52,  $p = 0.82$ ) indicating that there is no significant difference between the likelihood of profiles showing a master's degree between the groups.

### First Employment

The professional profiles for 155 alumni included information about the first job held upon graduation. First employment information was not included in the profiles for 20 alums, most of who had graduated before 1990, and in several cases, only the current position held was included in the profile.

As Table 1 indicates, IS program alumni entered the work force in a variety of positions, with more than half (55%) of initial jobs held being technical in nature (e.g. programming; networking, systems engineering, technical support). The rest of the first jobs entered enabled graduates to use a blend of their business and technical skills (being most apparent in the analyst, manager/coordinator, consultant, and project manager positions).

<b>Job Title (approximate)</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Business/Managerial Job Titles</b>		
Manager/Coordinator/Director	18	11.6
Account Manager	9	6.0
Project Manager	4	2.5
Analyst (Business/Systems)	23	14.8
Consultant	10	6.5
Other – Non Technical	5	3.2
Total of Business/Managerial Job Titles	69	44.5
<b>Technical Job Titles</b>		
Database Administrator	2	1.3
Developer/Programmer/Programmer Analyst	40	25.7
Network Engineer/Manager	15	9.7
Systems Engineer	11	7.1
Technical Support	14	9.0
Webmaster	4	2.6
Total of Technical Job Titles	86	55.5

**Table 1. First Job Title after Graduation**

#### **Positions Held Five Years Out**

LinkedIn profiles for 125 IS program alumni included information about positions held five years after graduation. Table 2 suggests that within five years of graduation, the percentage of program alumni in clearly technically-oriented positions had declined and the percentage performing more business, managerial, and customer-facing (internal or external) jobs had increased.

<b>Job Title (approximate)</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Business/Managerial Job Titles</b>		
Manager/Coordinator/Director	34	27.2
Account Manager	2	1.6
Project Manager	5	4.0
Analyst (Business/Systems)	15	12.0
Consultant	11	8.8
Other – Non-Technical	12	9.6
Total of Business/Managerial Job Titles	79	63.2
<b>Technical Job Titles</b>		
Developer/Programmer/Software or Systems Engineer	20	16.0
Network Engineer/Manager	9	7.2
Technical Support	2	1.6
Webmaster	1	0.8
Other – Technical Focus	14	11.2
Total of Technical Job Titles	46	36.8

**Table 2. Employment Pattern Five Years after Graduation**

### **Employment Churn**

Table 2 does not capture two important patterns in job changes for program graduates that occur within five years of graduation. One pattern is the emergence of two career tracks: one that is more deeply technical, and one that is more business related and/or managerial in nature. Both job title and employer changes are common for program alums during the first five years after graduation. Seventy-three percent of the alums experienced job title changes during this time span and almost an equal number (71.5%) having taken jobs with a different employer, often more than once. This employment churn tends to result in either further deepening of the individual's technical knowledge or migration from more to less technical (and/or from less to more business/managerial) positions.

### **Positions Held Ten Years after Graduation**

Sixty-eight LinkedIn profiles for IS program alumni contained information about positions held ten years after graduation. As Table 3 illustrates, ten years after graduation most program alumni hold job titles in managerial and customer-facing positions. Less than 20% hold job titles that coincide with a deep technical orientation.



Job Title (approximate)	Frequency	Percentage
<b>Business/Managerial Job Titles</b>		
Executive Management	10	14.7
Analyst	8	11.8
Consultant	10	14.7
Project Manager	9	13.2
Director/Manager	20	29.4
Total of Business/Managerial Job Titles	57	83.38
<b>Technical Job Titles</b>		
Network Engineer/Manager	2	2.9
Developer/Programmer/Systems Engineer	8	11.8
Principal Database Administrator	1	1.5
Total of Technical Job Titles	11	16.2

**Table 3. Employment Patterns Ten Years after Graduation**

Employment churn continued for program alums between five and ten years after graduation. Nearly two-thirds (65.7%) of the individuals providing job information ten years after graduation had changed job titles at least once following the position held five years after graduation. However, the percentage of program alums changing employers during this time span declined to 52.2%.

#### **Positions Held Fifteen Years after Graduation**

Thirty-four LinkedIn profiles for IS program alumni contained information about positions held fifteen years after graduation. Ten (29.4%) of the job titles for these alums included the rank/status of “Senior”, “Principal” or “Managing”. As Table 4 illustrates, fifteen years after graduation most program alumni hold job titles in management or executive management positions. Less than 20% hold job titles that coincide with a clear technical orientation.

Employment churn continued for program alums between ten and fifteen years after graduation. Sixty percent of the individuals providing job information fifteen years after graduation had changed job titles at least once from the position held ten years following graduation and the percentage of program alums moving to a different employer during this time frame was 56.7%.

Job Title (approximate)	Frequency	Percentage
<b>Business/Managerial Job Titles</b>		
Executive Management	8	23.5
Analyst	1	2.9
Consultant	4	11.8
Director/Manager	10	29.4
Project Manager	4	11.8
Other – Non-Technical	1	2.9
Total of Business/Managerial Job Titles	28	82.4
<b>Technical Job Titles</b>		
Developer	1	2.9
Systems Engineer/Architect	1	2.9
Other – Technical Focus	4	11.8
Total of Technical Job Titles	6	17.6

**Table 4. Employment Patterns Fifteen Years after Graduation**

#### Current Employment Patterns Revealed in LinkedIn Profiles

The current set of LinkedIn profiles for IS program alums includes five CIOs and two executive VPs for IT. Additional job titles, such as Director of IT, suggest that some of the alums hold the highest IT position in their organizations. The 175 alums in the current set of LinkedIn profiles are employed by (or own) 147 different organizations that span a wide range of industries and public sector agencies. Program alums are employed by well-recognized firms within the IT industry (e.g. Cienna, CSC, Dell, EDS, Google, Microsoft, Red Hat, TSYS, VeriSign, WiPro), within prestigious consulting firms (e.g. Accenture, Capgemini, Clarkston Consulting, Slalom), financial services (e.g., E\*Trade, Experian, GE Money, Sun Trust Banks, Wachovia), government agencies, colleges and universities, well-known companies in the health care, hotel/resort/restaurant, and defense industries. Moreover, the profiles indicate that the vast majority of both recent and older IS program alums remain employed within the field, with most occupying positions that enable them to leverage both business and technical knowledge. Only a few are in non-IT positions.

#### LIMITATIONS

As mentioned in the Method section, there were numerous factors that limit the conclusions that can be reached from the harvested data. The most significant limitation is the wide variation in the completeness and richness of the LinkedIn profiles that IS program alumni have created. A small percentage of these profiles are extremely rich and provide significant insight into the professional development of some of the program alums, while other profiles are incomplete and only include job title, employer, and length of time the job was held. Most LinkedIn profiles lie somewhere between these extremes, but are generally closer to incomplete than to being extremely rich. Additionally, some of the profiles for alumni graduating before 1990 fail to include information on entry level positions and only go back to positions held in 1995, 2000, or later, and several just list the current position held. These gaps make it difficult to determine the universality of the trends observed in this study.

Another potential limitation is the fact that LinkedIn profiles are, by nature, self-reports and therefore suffer from possible limitations associated with self-reported data. However, while it is possible to fabricate or exaggerate in the published profile, the likelihood of the information being inaccurate may not be high because of the potential to verify the history/claims via other sources.

The ability to generalize from the LinkedIn data for female alumni is also a limitation. As mentioned in both the Method and Results sections, there are certainly many more female program alumni with LinkedIn profiles that could not be definitively identified. At a time when female enrollments in IS programs is low, it is unfortunate that this investigation was unable to provide a more precise picture about the jobs and career progress of female program alums.

Additionally, the sample of profiles examined may include a small number from alumni who did not follow the traditional path of high school to college to career. Examples of non-traditional paths may include those followed by individuals in transition from military service to the private sector or those who are returning to college to facilitate a change in careers. While we were not able to conclusively identify all individuals in the sample who followed these or other non-traditional paths we expect that the numbers would be very small. Based on an examination of graduates from our program from 1984 through 2005, only 7% of our students were 25 or older when they began their schooling with our institution. Thus, we can say that the vast majority of our students follow a traditional path.

This investigation focused only on IS program alums and its results may not generalize to graduates from other computing degree programs, such as computer science. Also, the results are not likely to generalize to IS programs that have focused on preparing graduates for jobs in a limited set of employers. Despite the limited ability to generalize these findings, this study suggests that LinkedIn profiles for program graduates may be a valuable source of information for examining the career progress of IS professionals and testing career progress models.

#### **FEEDBACK**

It should be noted that numerous program alumni expressed thanks for the creation of the IS alumni group in LinkedIn. Feedback from many members of the alumni group indicated that group membership helps them feel more connected to the university, college, and department, and also provides a mechanism for them to re-establish connections with program alums that graduated at or around the same time. Accordingly, we expect the goodwill generated by the creation of the group to potentially provide long-term benefits. Creating IS program alumni groups and LinkedIn connections between faculty and alumni can also enable the creation of alumni-major mentor programs. The ability for current and prospective majors to be mentored by a program graduate could have a positive impact on an IS program's ability to attract and retain majors.

Both alumni and visiting business professionals have commented that senior-level students should not be allowed to graduate without a LinkedIn profile. This is sound advice in more ways than one. First, having a profile on LinkedIn may help the student land that first job. The presence on LinkedIn provides another mechanism for students to search for entry level jobs and a well-constructed profile can assist employers and head hunters find them for job openings. Because LinkedIn is becoming more widely used for job placement, requiring soon-to-graduate students to create a profile may be beneficial. Requiring a LinkedIn profile can also provide a better opportunity to track female graduates. As noted previously, female alumni are most likely to be missed by the search-identify-invite processes used in this investigation. This limitation could be reduced or minimized by requiring all seniors to post a LinkedIn profile prior to graduation. Requiring students to have a LinkedIn profile could also be used to get a better understanding of the skill sets and internship experiences that students develop prior to graduation. Mining current student and recent graduate LinkedIn profiles could enable IS departments to better communicate student takeaways to employers and prospective students.

## CONCLUSIONS

The LinkedIn profiles that have been assembled thus far provide valuable insight into the nature of entry-level jobs accepted by IS program graduates. It was shown that the first jobs after graduation are likely to be technical in nature. These findings are consistent with the literature investigating KSAs of entry-level employees. This insight can potentially be used by academic advisors to motivate and encourage IS majors to master concepts in programming and networking courses, as well as technology related courses. Since a large percentage of program graduates end up in systems/business/programmer analyst positions, advisors should also encourage majors to master systems analysis and design concepts. The information about first employment after graduation is also useful for developing greater insight into the employment prospects for prospective majors.

The harvested information also provides insight into the nature of career progress of IS program graduates over time. It was shown that within five years of graduation, numerous program graduates migrate from more technically focused jobs to more business and management oriented positions, thus enabling them to leverage both business and technical knowledge. Additionally, it was shown that ten years following graduation majors migrated toward increasingly more responsible management positions. The evidence suggests that the movement from technical to business/managerial positions slows once graduates are ten years into their careers. The findings are also consistent with other studies investigating the KSAs expected of IS/IT professionals in later stages of their careers. Hence, the data suggests that it is reasonable to advise current and prospective majors that although they may initially hold technical positions, over time they are more likely to move into more responsible (and lucrative) business/managerial positions, and have a good chance of achieving high-level management positions.

Besides helping to answer the study's initial questions, information in LinkedIn profiles has other potential uses such as an aid for IS curriculum design. The probable career path of IS graduates reflected in the study (from technical to managerial positions) supports the view that within the IS curriculum there should be a balance between broader conceptual and managerial issues (e.g., IS strategy) and more practical and technical aspects of IS (e.g., application development). While the actual balance will likely remain an open question, it does highlight the need to retain technical focused courses within undergraduate IS courses. In this respect, a recent move to remove application development from the core can be seen as controversial. Another use of LinkedIn profiles is for assessment of the longer-term program success. Tracking program graduates provides a measure of career success of program participants; therefore, this can be used for program evaluation purposes, such as when seeking re-accreditation.

Planned work includes updating the dataset used in this analysis, as the number of members within the Alumni group continues to grow over time, and members seek new employment opportunities. In addition, we are exploring the possibility of developing visualizations that may aid in the analysis of career progress. Finally, it would be interesting to compare our results to an investigation of career progression in other employment fields. Traditionally, a strong message associated with enrolling in an IS degree is that leveraging a technical/business education will enable a graduate to more quickly and successfully transition from technical into more senior managerial positions, compared with graduates having solely a technical-focused education. Testing this proposition is another potential promising use of the LinkedIn dataset.

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