2016

Career Paths of Computing Program Graduates: A LinkedIn Analysis

Thomas Louis Case
Georgia Southern University, tcase@georgiasouthern.edu

Hyo-Joo Han
Georgia Southern University, hhan@georgiasouthern.edu

Eric Rimes
Georgia Southern University, er01617@georgiasouthern.edu

Follow this and additional works at: http://aisel.aisnet.org/sais2016

Career Paths of Computing Program Graduates: A LinkedIn Analysis

Thomas Case
Georgia Southern University
tcase@georgiasouthern.edu

Hyo-Joo Han
Georgia Southern University
hhan@georgiasouthern.edu

Eric Rimes
Georgia Southern University
er01617@georgiasouthern.edu

ABSTRACT

Information harvested from the LinkedIn profiles computing program alumni can be used to better understand the quality of entry-level jobs and careers, issues that have grown in importance alongside university accountability. This investigation provides insight into how one university is leveraging LinkedIn University Pages and data in alumni profiles to provide accountability-oriented evidence of entry-level job quality, employer quality, career advancement, and computing program degree quality.

Keywords

Social media, social networks, LinkedIn, University Pages, universi

ty alumni careers

INTRODUCTION AND LITERATURE REVIEW

LinkedIn emerged as the social media benchmark for business and professional networking more than a decade ago (Schuen, 2007). Although other social media sites provide social networking capabilities for business professionals, none have matched LinkedIn's growth and usage by business professionals. LinkedIn is the world's largest professional network whose membership surpassed 332 million in 2014 (A Brief History of LinkedIn, 2015).

LinkedIn enables registered members to establish and document networks of people they know and trust professionally. The basic membership for LinkedIn is free and relationships among LinkedIn members are called "connections." Unlike other no-fee social networking sites such as Facebook or Twitter, LinkedIn has traditionally required members to have pre-existing relationships to establish connections. (What is LinkedIn, 2015).

LinkedIn provides a venue for the personal branding of one's skills and professional credentials (Wetsch, 2012). LinkedIn enables the creation of a professional profile that includes a photo (optional), education and career history, and professional affiliations. Graduates of computing programs typically provide a listing of the positions that they have held, the employers they have worked for, the university (or universities) they graduated from, and the degree(s) that they received. Their profiles may also include recommendations from fellow professionals, a list of personal KSAs (knowledge, skills, and abilities), professional certifications, and descriptions of the IT projects that they have worked on.

LinkedIn members can invite others to connect to them, accept connection invitations initiated by others members, join groups (corporate, conference, networking, industry, professional, alumni, etc.), and establish new groups. LinkedIn has amassed sufficient "Big Data" to enable the application of predictive analytics, so now, after establishing new connections, LinkedIn members are confronted with a recommended list of other LinkedIn members to whom they may want to connect.

Douglis (2010) identifies three important job-related LinkedIn roles: recipient of an inquiry (e.g., from a job hunter), intermediary (e.g., passing employment related messages along to others on behalf of friends), and job hunter (e.g., seeking employment). As observed by Hempel (2010), "If you don't have a profile on LinkedIn, you're nowhere." Although that observation was made more than half a decade ago, it still rings true today.

LinkedIn and Higher Education

The LinkedIn database is a valuable information repository. LinkedIn has established 'analytics teams' of 'LinkedIn data scientists' to mine the data to produce interesting and valuable insights. The work of these teams has contributed to the development of new services such as University Pages and Field of Study Explorer whose potential users include more than students (Powerformula, 2014). University Pages and Field of Study Explorer are marketed on their ability to help prospective choose a university to attend and to help both current and prospective students choose a major.

University Rankings have been added to LinkedIn's Higher Education services and some think it has the potential to be a game changer (Chouda, 2015). Davidoff (2015), however, discounts the importance of university rankings. Davidoff discusses a recent survey conducted by Admittedly, a college admissions service, which revealed that *U.S. News* university rankings was #20 (of 27 factors) in importance when selecting a university to attend. Twice as many students said that rankings were "not important at all" to those who said that they were "very important". The four factors that students most care about when choosing a university are: majors, cost, safety, and employment. So, University Rankings may not prove to be a game changing LinkedIn service. On the other hand, the Admittedly study findings suggest that University Pages and the Field of Study Explorer may gain popularity because they enable users to filter university alumni profiles on dimensions such as: where they work (employment), what they do (employment), and what they studied (majors).

Despite LinkedIn's potential usefulness in student decision-making, research on student use of LinkedIn suggests that its potential has not been realized. Hall (2013) conducted a study which found that university students underutilize LinkedIn when searching for a job. Dach (2015) observed that a majority of students in her sample used LinkedIn in job searches as well as a wide range of LinkedIn services, but also observed that the rest of her sample did not have LinkedIn accounts and perceived little utility in having one. So, the availability of LinkedIn job search capabilities, University Pages, and Field of Study Explorer may not necessarily translate into high levels of student use.

University Uses of LinkedIn

In a recent *Educausereview* article, Craig and Williams (2015) note that the metadata in LinkedIn profiles can be used to:

- Suggest jobs/employers that best match the individual
- Identify individuals to prospective employers where they appear to be well-matched
- Suggest future jobs/employers based on the individual's career trajectory, velocity, and professional development
- Pre-identify individuals to prospective employers where they may be a good match in the future
- Facilitate assessments, curriculum, project work, and virtual internships with prospective employers
- Suggest educational experiences based on targeted jobs/employers and competency gaps
- Pre-identify individuals to prospective education providers based on target jobs/employers and competency gaps
- Facilitate educational interactions with prospective education providers.

Craig and Williams (2015) encourage universities to be proactive in using LinkedIn for academic advising and marketing their students and graduates to employers. They suggest that is especially important for mid-term universities and also suggest that universities which underutilize such metadata risk being marginalized by other "competency providers."

Other voices that offer guidance on how LinkedIn can be beneficially used by universities include Goral (2013), Corrado (2013) Schaffhauer (2013) and Peterson and Dover (2014). Goral (2013) provides an overview of how LinkedIn can be used in student recruitment and career advisement. Both Schaffhauer (2013) and Corrado (2013) describe how University Pages can be used to build a brand, engage prospective students, re-engage alumni, and highlight areas of expertise. Peterson and Dover (2104) add that LinkedIn can help students build networks with working professionals that can be used to find internships and jobs.

LinkedIn and University Accountability

In era of rising tuition and increasing levels of average student loan debt for university graduates, political and practical calls for university accountability grow louder. Multiple stakeholders are paying keener attention to graduation and job placement rates and universities are feeling more pressure to demonstrate that their degree programs provide paths to worthwhile jobs and careers. Numerous states require their publically-funded universities to submit annual accountability reports and some use the report results to decide funding levels for individual institutions. Numerous private universities have also created accountability committees to monitor and report on the achievement of graduation and job placement goals.

In 2011, the state of Georgia initiated a statewide Complete College Georgia Initiative whose goal is to "increase the number Georgians with a high quality certificate or degree" (Complete Georgia, 2015) and since 2012, Georgia's public universities and technical schools have been required to submit annual Complete College Georgia progress reports. To date, most progress reports have focused on improving six-year graduation rates and student progress toward graduation. Considerably less attention has been focused on job placement and demonstrating the quality of degrees and certificates. From an accountability perspective, strong arguments can be made that a degree or certificate's quality is best measured by the marketplace, e.g. via graduates being hired into high-quality jobs by high-quality employers.

Many universities are ill-equipped to monitor alumni job placement. Sometimes this is because it is unclear with university unit(s) should be tasked to do the monitoring. Regardless, the fact remains that if accountability measures do not place a high-priority on high-quality job placement, universities are likely to continue to focus on more internally-controllable processes such as graduation rates and progress toward graduation.

So, many universities lack good data about in-field placement rates and whether in-fields jobs are high-quality positions at high-quality employers. Most universities also lack data about career patterns of their graduates.

Many MIS programs have also done a substandard job in collecting accountability-oriented data about their graduates. Although, Management Information Systems is perennially rated in the top tier of university majors in terms of starting salaries (e.g. NACE, 2014), MIS enrollments continue to languish at many universities. The inability of MIS programs to clearly articulate job placement rates, typical entry level jobs, employers, and career advancement may be a contributing factor.

Simply encouraging prospective and current students to use LinkedIn University Pages and Field of Study Explorer to discern why a major in IS (or CS or IT) is worthwhile is an insufficient response to questions about jobs, employers, and careers. As shown by Hall (2013) and Dach (2015) many students do not have LinkedIn accounts and perceive little utility in creating one. In addition, despite the filtering capabilities of LinkedIn Higher Education services, answers to job placement and career progress questions are not necessarily easy to unearth. While the filters can be useful in identifying relevant alumni profiles, it is often necessary to drill into individual profiles to get sufficiently granular answers to questions about jobs and careers.

RESEARCH GOALS AND METHODOLOGY

The overall purpose of this study is to provide data to address accountability-oriented questions about the employment and career quality of graduates of computing programs at a mid-sized comprehensive university in Southeastern USA. One goal is provide data relevant to the quality of entry-level jobs and employers of computing program graduates. A second goal is to examine the career patterns of computing program alumni. This investigation should provide the data needed by degree program administrators to describe the entry level jobs of program graduates, the employers that are hiring program graduates, and graduates' career patterns. Such information may be valuable to prospective students (and their parents) and has the potential to contribute to judging the quality of degrees and certificates.

This study seeks to gain insight into entry level jobs and career patterns by tapping into the data and information that resides in university alumni LinkedIn profiles. Case et al (2013) conducted a similar investigation prior to the launch of University Pages that focused on the career patterns of graduates of an Information Systems degree program. This investigation leverages some data harvesting methodology employed by Case et al (2013), but uses University Pages to identify a more extensive set of alumni profiles; one that includes alumni profiles from multiple computing programs.

Using LinkedIn profiles to examine entry level jobs and career progress is one of several data collection approaches that could be used. Other investigations that attempted to longitudinally assess the career paths of IT professionals have used different methodologies. Surveying computing program alumni could be used. However, the generalizability of survey results is dependent on acceptable response rates, absence of response bias, and other factors. And, data collected via a survey may add little utility beyond that which is already in alumni LinkedIn profiles.

For many universities, University Pages enables access to thousands of university alumni profiles. It enables investigators to filter on major, degree year and other variables to identify alumni profiles that include data relevant to particular research questions which can be harvested in an unbiased manner. For this investigation, LinkedIn alumni profiles were observed to be the most complete, convenient, and relevant data source for addressing its accountability-oriented goals.

Leveraging LinkedIn profiles to identify professional career patterns is likely to become more common. An example is Bastin's (2012) study of the careers of French journalists.

This investigation's data set includes the LinkedIn profiles of members of a closed group of computing program alumni that has 930 members. Although originally created to be a social networking site for IS program alumni, it has become more diverse and includes a limited number of profiles of CS and IT program graduates as well as a limited number of profiles of university graduates who minored in IS and/or earned a non-computing degree and subsequently entered ICT careers.

The university's University Pages is being used to identify profiles of IS, CS, and IT program alumni who are not members of the closed group. This will enable the dataset to be much larger in size and will make it possible to provide a richer and more robust picture of entry level jobs taken by graduates from each computing program and subsequent career patterns.

Table 1 provides a summary of employment and education data that is being harvested from individual LinkedIn profiles.

Demographics	Current Employment	Previous Employment	Entry Level Employment	Employment 5 Years after Graduation	Employment 10 Years after Graduation	Employment 15 Years after Graduation	Employment 20 Years after Graduation
Name	Job Title	Job Title	Job Title	Job Title	Job Title	Job Title	Job Title
Gender	Employer	Employer	Employer	Employer	Employer	Employer	Employer

Table 1: Harvested Employment Data

Table 2 summarizes the education data being harvested from LinkedIn profiles

Demographics	Major	Minor	Masters Degree	2nd Masters Degree	Doctoral Degree	Certification
Name	First Major	First Minor	Degree	Degree	Degree	1st Certification
Graduation Year	2nd Major	2nd Minor	Year	Year	Year	2nd Certification

Table 2: Harvested Education Data

PRELIMINARY FINDINGS

This investigation is still in the data harvesting phase. So only preliminary results are available at this time. To date, data from the profiles of 265 members of the alumni group has been harvested. These include 117 IS, 20 IT, and 6 CS graduates.

Table 3 summarizes the most common first employment patterns that has been in the initial set of harvested data.

Information Systems Graduates (n=117)		IT Graduates (n=20)		CS Graduates (n=6)	
First Job Title	**Frequency**	**First Job Title**	**Frequency**	**First Job Title**	**Frequency**
System Analyst	11	Security Specialist	2	Programmer	2
Developer/Programmer	10	IT Support	2	Analyst	2
Consultant	6	Web Developer	2	Implementation Specialist	1
Client/Technical Support	13	Analyst	2	Non-IT	1
IT Management	9	Non-IT	11		

Table 3: Most Frequent First Job Titles of IS, IT, and CS Graduates

Table 4 provides insight into the career patterns of IS program alumni. Seventy-three IS program graduates are five+ years into their careers. Forty-one are 10+ years into their careers, and 16 are in 15+ year careers. While few conclusions can be reached from the data that has been collected, evidence of career advancement toward responsible positions is suggested.

Table 5 summarizes the most frequent job titles of recent Information Systems graduates who have graduated within the last five years (n=26).

5 Year Job Title (n=73)	Frequency	10 Year Job Title (n=41)	Frequency	15 Year Job Title (n=16)	Frequency	20 Year Job Title (n=6)	Frequency
Analyst	12	IT Manager	9	IT Manager	7	Project Manager	1
Manager	11	Consultant	4	Project Manager	5	Solutions Manager	1
Project Manager	6	Analyst	8	IT Business Owner	2	Sr. Developer	1
Database Administrator	4	Project Manager	4	Network Engineer	1	Solutions Analyst	1
Developer	8	VP	2	Sr. Developer	1	Graphic Designer	1

Table 4: Five, Ten, Fifteen, and Twenty Year Job Titles of Information Systems Majors.

Job Title	Frequency
SAP Analyst	4
Business Analyst	4
Consultant	5
Systems Administrator	3
Technical Support	2

Table 5: Current Job Titles of Recent Graduates

Recent IS graduates are currently employed by well-known companies including BMW, General Motors, Georgia Pacific, Hewlett Packard, Textron, Wells Fargo, and Verizon Wireless. They also hold positions in well-known consultancies including Deloitte, Ernst and Young, KPMG, HCL Axon, and Manhattan Associates. The profiles of recent IT graduates suggest that they are also landing jobs with high quality employers including BMW, CSC, Nordstrom, and Norfolk Southern. The IT graduates' data also suggests that they have been able to successfully leverage an IS minor to find quality employment; four of the seven recent IT graduates in the data set has been assembled thus far are working in SAP positions.

PLANNED ANALYSES

The data being aggregated will be imported to Access to facilitate queries and robust filtering. It will also be imported to SPSS to facilitate the identification of descriptive statistics, including frequencies and relative frequencies. Non-parametric statistics including Chi-square analysis and rank-order correlations will be used to assess differences among entry level jobs taken by graduates of different computing majors and the jobs they hold later in their careers. Parametric statistics, including t-tests between pairs of percentages, will also be used to evaluate differences among career patterns.

LIMITATIONS AND IMPLICATIONS

Alumni LinkedIn profiles vary in completeness and richness. Some individuals devote considerable time and effort in building and maintaining their LinkedIn profiles while others have not. In numerous instances, especially university alumni who graduated before social media became commonplace (those who are typically deep into their professional careers), only recent employment experiences is included and entry-level employment history is sketchy or non-existent. Descriptions of positions held also vary richness. In some profiles, the description provides a relatively detailed picture of job responsibilities, platforms and tools used, etc. while others are limited to one or two line summaries, or just job titles.

Despite these limitations, harvested information from most alumni profile provide insights about employment history including into the jobs that computing program alums enter after graduation, as well as information snapshots of positions held five, ten,

and 15 or more years after graduation (in profiles of not-so-recent alumni). While imperfect, LinkedIn profiles yield data relevant to accountability-oriented issues such entry level job quality and employer quality.

LinkedIn alumni profiles can be used to address questions of interest to numerous university constituencies including academic administrators (department chairs, deans, and provosts), academic advisors, career services professionals, admissions recruiters and enrollment management professionals, prospective students and their parents, current students, employers and IT recruiters. Another potential use of LinkedIn profile analysis is the evaluation and accreditation of university computing programs.

REFERENCES

1. Bastin, G. (2102) Newsworkers and their gendered roles: Finding of a longitudinal analysis of 1,171 LinkedIn profiles of French journalists. *Textual & Visual Media,* 5, 17-30.

4. Case, T. Gardier A., Rutner, P., and Dyer, J. (2013) A LinkedIn analysis of the career paths of Information Systems Alumni. *Journal of the Southern Association for Information Systems*, 1 (1), 1-13. Retrieved from: http://quod.lib.umich.edu/j/jsais/11880084.0001.102?view=text;rgn=main

5. Choudaha, R. (2015) LinkedIn: The future of global university rankings? *University World News*, May 8, 2015. Retrieved from: http://www.universityworldnews.com/article.php?story=2015050515565265

6. Complete College Georgia (2015) Retrieved from: http://completega.org/content/campus-completion-plans

7. Corrado, T. (2013) How LinkedIn's University Pages Will Kick Your Marketing Strategy Up a Notch. Retrieved from: http://blog.hubspot.com/marketing/linkedin-announces-university-pages-nj

8. Craig, R. and Williams, A. (2015) Data, technology, and the great unbundling of higher education. *Educausereview,* September/October, 11-25.

9. Dach, M. (2015) A Case Study of LinkedIn. Retrieved from: http://sfsu-dspace.calstate.edu/bitstream/handle/10211.3/145661/AS362015BROADD33.pdf?sequence=1

10. Davidoff, J. B. (2015) College Rankings No Longer Rank, *Forbes,* June 17, 2015, Retrieved from : http://www.forbes.com/sites/ryancraig/2015/06/17/collegerankings-no-longer-rank/

11. Douglis, F. (2010) It's all about the (social) network, *IEEE Internet Computing,* 14, 1, 4-6. http://dx.doi.org/10.1109/MIC.2010.13

12. Goral, T. (2013). LinkedIn for student recruitment and networking. *University Business*, 16(10), 22.

13. Hall, B. (2013). Why Aren't College Students Using LinkedIn To Find Jobs? Retrieved from http://readwrite.com/2013/04/23/why-arentcollege-students-using-linkedin-to-find-jobs

14. Hempel, J. (2010) How LinkedIn will fire up your career, *Fortune,* 161, 5: 74.

15. NACE (National Association of Colleges and Employers) (2104) Class of 2014: Top-Paid Business Majors. Retrieved from: http://naceweb.org/s05282014/top-paid-business-majors.aspx

16. A Brief History of LinkedIn (2015) LinkedIn.com, https://ourstory.linkedin.com/

17. What is Linkedin? (2015) TechTarget.com, http://whatis.techtarget.com/definition/LinkedIn

18. Peterson, R., and Dover, H. (2014). Building student networks with LinkedIn: The potential for connections, internships, and jobs. *Marketing Education Review*, 24(1), 15-20.

19. Powerformula. (2014) Field of Study Explorer: A great new LinkedIn feature (and it's not just for students. Retrieved from: http://www.powerformula.net/5967/fields-expertise-great-new-linkedin-feature-just-students/

20. Schaffhauser, D. (2013) Everything you need to know about LinkedIn University Pages. *Campus Technology*, November 7, 2013. Retrieved from: http://www.powerformula.net/5967/fields-expertise-great-new-linkedin-feature-just-students/

21. Wetsch, L. (2012). A personal branding assignment using social media. *Journal of Advertising Education*, 16(1), 30.