

RUNNING HEAD: IT ALUMNI TRACKING PROMISING PRACTICES

**Alumni Tracking: Promising Practices for Collecting, Analyzing, and Reporting
Employment Data**

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Information Technology Alumni Tracking: Promising Practices for Collecting, Analyzing, and Reporting Employment Data

Abstract

This paper documents the approach that the Florida Information Technology Career (FITC) Alliance undertook to establish an alumni-tracking system for undergraduates who majored in information technology (IT), computer science (CS), and computer engineering (CE). Postsecondary institutions that are able to document successful links between their programs, degree attainment, and employment achieve a competitive advantage. Often, sharing details about how to attain this competitive advantage through successful alumni tracking is difficult due to privacy concerns. This study provides promising practices and techniques for collecting, analyzing, and reporting program completion outcomes through alumni tracking without sacrificing student privacy. A key finding is that several institutional research strategies can considerably improve alumni tracking for most programs. Suggestions for future research are also provided.

Keywords: Alumni tracking, career pathways, employability, institutional research, workforce readiness, information technology, computer science, computer engineering

Information Technology Alumni Tracking: Promising Practices for Collecting, Analyzing, and Reporting Employment Data

Information technology is the fastest growing industry sector in Florida with the largest deficit of skilled workers. To address this persistent gap, in 2014, the Florida Board of Governors' (BOG) supported Florida State University (FSU) and partners to establish the Florida Information Technology Career (FITC) Alliance, a project to strengthen Florida's undergraduate computing and technology school-to-career pathways. FITC increased the number of students pursuing undergraduate degrees in selected technology majors and resulted in a promising model to successfully recruit, retain, and employ students headed to information technology (IT), computer science (CS), and computer engineering (CE) careers.

To meet BOG requirements, the FITC project team was asked to obtain program completer (i.e., alumni) outcomes data one year after students attained a degree in CS, IT, and CE. The BOG's project reporting requirements included performance metrics related to target undergraduate student enrollments, completions, completion rates, and completer outcomes for five years (i.e., cohorts graduating from 2013-14 to 2017-18). Completer outcomes were considered a FITC priority because the BOG allocated funds with two main goals: 1) strengthen pathways in computing and technology fields that extended beyond degree attainment to employment in these fields and 2) increase the number of graduates employed in Florida. Completer outcomes are still reported annually to the BOG and each year, with the new cohort's data aggregated with cohort data from prior years. The FITC Alliance team developed and refined processes and steps to identify, collect, and report alumni performance metrics.

The purpose of this paper is first to document the processes that FITC developed and honed to track two cohorts of alumni and, second, provide techniques and recommendations for collecting, analyzing, and reporting employment data. The paper's goal is to provide these tested practices to institutions that are experiencing challenges in obtaining and using alumni data to support policy-making, goal attainment, as well as program and curricular modifications. We pursued this goal by seeking the answers to three reporting requirements:

1. What percentage of alumni in CS, CE, and IT are employed within a year of obtaining their undergraduate degree?
2. What are the salaries of alumni in these majors after they have graduated from these programs?
3. Where (geographically) are students employed after graduation? To what extent are these students employed in state after graduation?

As we explore these questions within the context of FITC project, we will describe our promising data collection and analysis practices. We conclude with recommendations for program specialists tasked with similar reporting requirements.

Key Concepts and Promising Practices

Tracking alumni is challenged by factors such as the extensive cooperation needed among numerous institutional units; the multi-faceted approaches needed to collect necessary data;

internal institutional policy barriers; and even a misguided notion that alumni-tracking is not the job of postsecondary institutions (Chan & Derry, 2013). Additional challenges stem from the difficulties inherent in collecting person-level data such as employability, employment reporting, and other contextual factors.

Alumni Employability

A significant challenge to tracking alumni employment is academia and support services' unfamiliarity with or detachment from measures that concern "placement," "employment," and "employer engagement" (Troutman & Shedd, 2016; Voorhees, 2005). The most common reasons college career counselors cite for not tracking alumni employment are that they are not responsible for hiring and because neither the graduate nor the employer is required to inform the college of whether the graduate was hired (Schaub, 2012).

Nevertheless, institutions strive to document and communicate the speed and extent to which graduate employment follows degree attainment (TGSLC, 2013). One of the markers of an effective academic program is student employability as demonstrated by high employment rates (especially if immediately upon degree completion) and embedded employer engagement prior to graduation. In fact, programs with high levels of employer engagement and those whose graduates are hired immediately upon graduation are considered to have acquired competitive advantage over higher education institutions that have not focused on these outcomes (ICEF Monitor, 2014). Informed by this research, FITC team reasoned that attaining high completer outcomes would rely on enhancing student employability, which in turn would serve as a measure of program effectiveness and success.

Employment and Contextual Factors

The BOG defined employment as the number of alumni working full-time or part-time in a position related to their field, or alternatively enrolled (or accepted) into a computing or technology graduate program within a year of graduation. The BOG also wanted to know whether the graduate remained in the state of Florida or had accepted a position out-of-state, an important metric for determining the extent which technology and computing graduates are drawn to major U.S. cities that are home to Fortune 500 companies.

As Appendix A shows, the Florida Board of Governors provided the FITC team with questions for alumni cohorts each academic year. Because the BOG was primarily interested in variables related to employment (employment status, job location, relatedness of job to field, and annual salary range) and educational alternatives, such as enrollment in a technology or computing-related graduate program, the FITC Alliance team modified the survey in adding: 1) three additional salary ranges to more accurately represent the higher salaries that were possible for students in technology and computing fields upon graduation; 2) "self-employment" as a response to the first survey question relating to job status. This addition allowed us to determine the number of students who might have started their own business; and 3) a field to capture data on students working out of the country. We also captured student demographics (gender, race, ethnicity) and transcript information such grade point average (GPA) on the modified survey. These changes allowed us to correlate program completer outcomes data with other student information.

Promising Practices

- Have preliminary discussions and agreement with faculty and administrators to define successful completer outcomes to guide questionnaire creation.
- Identify and define what types of employment or employment alternatives are considered successful outcomes for your program.
- Identify and define which contexts (e.g., geography, industry) are a priority to decision-makers at your institution and state.

Internal Institutional Barriers

The FITC team became aware of a series of institutional policies and procedures that needed to be addressed prior to data collection. Although we knew that academic department staff did not need Institutional Review Board (IRB) approval to track and maintain academic unit productivity data for making policy or programmatic decisions, given the nature of the grant and likelihood of publishing and marketing program results, we obtained IRB approval prior to the collection of any alumni data. The IRB required details on how student records would be kept confidential and posed questions such as: 1) Who would have access to the data? 2) Where would the data be stored? 3) How would the data be encrypted for confidentiality?

Institutional data (e.g., admissions records, transcript information, and demographic data) on individual students were not made readily available to university employees. Personnel were often required to complete specialized software training to obtain the administrative and institutional clearance required to view and retrieve student data. We carefully selected the FITC team members who would obtain these permissions and ultimately be responsible for collecting the information and reporting it to the BOG.

Once IRB approval had been granted and FITC team members had completed necessary training, the university administration informed us of a policy that limited the number of times that alumni could be surveyed in any given year. The institution adopted this policy to minimize phone calls to current or former students and limit reoccurring university-related solicitations. Human subjects protection as well as student and alumni privacy concerns shaped important aspects of our project planning.

Promising Practices

- Obtain IRB approval if the data might ever be marketed or published.
- Seek clearance from appropriate institutional offices to use institutional research records and determine best ways to keep data confidential.
- Identify institutional policies that govern student surveys and data collection at your institution.

Student Contact Information

Once we received the appropriate clearances, we needed to extract student contact information from our university database in order to contact alumni. The FITC team member responsible for BOG reporting underwent the necessary training to gather and analyze student contact information. Then, the FITC team determined the exact contact information that we would extract from the database. We concluded that we would use a multi-faceted alumni outreach

approach, requiring graduates' home of record, their temporary phone numbers, and their local addresses while at the university. We also extracted primary and secondary emails.

In addition to institutional research data, we provided the university's alumni services with a list of graduates and asked them to provide the graduates' latest contact. We cross-referenced the contact information from alumni services with the institutional research data and merged all of the contact data into one spreadsheet. Only authorized FITC team members participated in the data merge. Once the data were encrypted and stored on a designated secure computer, graduate assistants conducted basic analyses.

Promising Practices

- Identify the personnel to be trained and cleared to use institutional data, preferably someone skilled in working with large datasets, knowledgeable about data cleaning, analysis, and results generation.
- Leverage appropriate institutional data available to ensure that you have the most current student contact information available.

Analyzing Completer Data: FITC Results And Promising Practices

We designed this study's methods to be consistent with alumni tracking system recommendations from the Education Advisory Board of the Student Leadership Affairs Council (2008; 2012). We used multiple methods to generate completer outcomes data: qualitative methods (i.e., surveys, a telethon, and a special social media pilot) for data collection and quantitative methods (i.e., frequencies, cross-tabulations) to generate descriptive statistics. We used data for reporting and promotional visualizations (e.g., charts and infographics).

Program Completer Population

The total population of alumni graduating in Year 1 (2013-2014) was 258 and in Year 2 (2014-2015) was 312, for a total population of 570 completers being tracked in both cohorts.

Data Collection

Surveys. We surveyed all 570 alumni: in the summer of 2015, we surveyed the cohort graduating in 2013-2014 (n=258); in the summer of 2016 we surveyed the cohort graduating in 2014-2015 (n=312). For longitudinal tracking, we re-surveyed the Year 1 cohort in Year 2, along with the Year 2 cohort. Here, we will report the summer 2016 data collection, which includes aggregated data for cohorts 1 and 2 (N=570).

Survey Challenges. After the initial launch of the surveys, 20% of the emails bounced back. Undelivered emails were immediately tagged in our records and an email resent to secondary emails listed in our contacts. However, after resending the surveys to the secondary emails, we found that only 2% of those emails were actually delivered (while the others bounced back yet again). We contemplated mail-outs to reach them, but it was neither financially nor logistically feasible at the time. Ultimately, we decided not to pursue the 18% of students whose email addresses were not working and hoped to reach these alumni through other collection techniques (e.g., the telethon phase). We also focused only on alumni with valid email addresses for subsequent or follow-up survey reminders.

We attempted to improve and incentivize survey participation by entering participants in a raffle to receive several prizes. Although we are unsure of the effect that prize incentives had on increasing alumni responses, we entered all survey completers that met the survey deadline in a drawing for a Raspberry Pi robotics kit and then had a second drawing for subscriptions to both *Wired* and *Popular Science* magazines. At the completion of the survey efforts, we received an overall response rate of 20-30% across the three programs individually, and a 25% response rate collectively. While by most standards, 20-30% response rates are considered acceptable using survey techniques, especially for alumni, we were far from reaching the 50-90% response rates requested by the BOG.

Another factor affecting response rates is survey timing. Many university departments and offices solicit alumni each year. Higher education institutions also launch post-graduate surveys at graduation and six months after graduation. We considered using data from the post graduate survey but response rates on the post graduate survey are often high at the point of graduation, but they dip to 10-15% at the 6-month follow-up, which would not have met either the BOG's one year after graduation requirement or their 50-90% response rate goal.

Survey fatigue is also an issue. Some alumni indicated that they had already completed our survey or that they were extremely annoyed about answering the same questions for different people—just the situation the university limit on alumni contact was designed to curb. We also had anecdotal evidence that our Year 1 cohort thought it was too cumbersome to answer the same questions each year.

Additional students later reported that they did not respond to the survey by email because they felt that they did not have any substantial employment information to report—they were still looking for, did not have, or were not seeking a job. For the FITC team, this last category of alumni comments raised the issue of underreporting or excluding job seekers. This factor is a notable limitation of alumni tracking and caveat to data interpretation.

Telethon. After the survey phase was complete, we called all survey non-responders, which included the 18% of students whose emails were returned “undelivered.” For two weeks, two graduate students called these alumni. We created phone scripts, obtained IRB approval for them, and trained two students to follow the scripts and have consenting alumni complete surveys over the phone.

The phone efforts resulted in a 5% increase in response rates because we were able to contact 1% (out of the 18%) of the alumni that we were unable to reach via the survey phase, which left us with 17% of our original 570 alumni unreachable.

Telethon Challenges. There are a few considerations to be made concerning phone calls. Approximately 60% of phone numbers were valid, while the remaining 40% of phone numbers were disconnected or non-working numbers. Of those with working or valid phone numbers, 75% were left with direct messages or voicemails with moms, dads, or significant others. In the case of voicemails, the phone team had a dedicated phone number for returning calls, but only a handful of alumni ever returned our phone calls.

Some people were skeptical about answering questions related to their salary or jobs over the phone. Therefore, our internal policy was to kindly and sensitively get as much information as possible from the consenting participant. Often, callers received rebukes and stern responses

from potential participants; in these cases, callers were directed to gently thank the alumna or alumnus and end the call.

This data collection technique was probably the research team's least enjoyable, given the low rate of response and the number of awkward and unpleasant interactions.

Social Media. Although our attempts resulted in a 25-40% response rate from email and telethon, we quickly discovered that the College had social media contacts for many of the non-responders because many of them had participated in course-related social media (e.g., LinkedIn), had been engaged in other college or university clubs' social media, or belonged to the college Facebook group.

The next step, then, was to form a social media task force to make direct contact with or "ping" each non-responder through social media. The message was personable: "*Hi [student name], how are you? We are trying to get information on our graduates to help improve our programs and we have not heard from you. Please fill out the survey found at this link!*" The social media outreach effort took about 2 weeks. Every other day, the task force downloaded reports from each of the social media sites to determine which of the students had responded to the survey. After a few rounds of social media "pings" to the alumni, the IT program ended with a 68% response rate, an increase of 28% from the telethon round. Although we only used the social media strategy with our IT program alumni, the effort was deemed successful and worth implementing for all programs in Year 3.

Social Media Challenges. We learned a great deal about the logistic preparation and time required to properly conduct alumni outreach via social media. This strategy depends on students' voluntary participating in social media groups related to the university and the college. These efforts needed to be embedded in the courses, clubs, and student life activities throughout a student's time at a university. Because many social media platforms prohibit contacting large numbers of people at once with a link (it is considered spam), students must already be connected with the university and college sponsored social media sites; the contacts should not go through a staff, faculty, or student personal account.

Promising Practices

- Institutions that seek to analyze longitudinal data should consider collecting alumni data every other year. Establishing a window for data collection is important to allow alumni sufficient downtime between data collection periods.
- Constantly compare the initial survey population list to the survey respondent list by merging spreadsheets or using another simple data merge tool. For example, these comparisons can be used to assess how well participants are responding to the data collection methods as well as to determine response rates. Often, merging spreadsheets can require skill to create formulas in Excel, for example, to merge multiple spreadsheets by last name.
 - When data sets are merged, manually verify that the names participants use their surveys match names on the participant record. Alumni often enter nicknames on the survey and the formulas created in Excel cannot decipher unequal matches; these records will have to be manually merged.
 - Make proactive attempts to encourage the use of institutionally sponsored social media before students graduate. This would drastically reduce the complications (in time and money) that later arise in tracking alumni. Programs or institutions

that are able to keep students connected through social media while at their institutions are likely to have improved social media outreach after the students have graduated.

- Know that graduation records can change daily. For example, we did not survey three alumni because their data did not appear until after the survey was sent out. For those with live enrollment and graduation systems, ensure that you export a list of students that represent your initial data set and use only that data set once data collection begins.
- Anticipate that there will be double majors in some of the fields, so ensure that surveys are not sent twice. Anticipate as many unique cases as possible to determine how you might handle such situations. Do you count the surveys of double majors twice, when they only returned one survey? How do you determine which program to credit with the response? We counted double majors once when data were being aggregated, but counted twice when the information was being reported by major.
- Ensure that your data formats are compatible other data such as employer outcomes data and student demographics data. One integrated data set allows for more analysis options.
- Decide whether you will collect information on the survey that you already have in other data sets or will use and then merge IR data with survey data to minimize questions to decrease survey length. We chose to obtain only the student's first, middle, last name, and maiden name (if applicable) to link institutional data with survey data in order to aggregate the data for accurate reporting. For small populations, merging datasets one-by-one may not be cumbersome, but for larger datasets and larger number of datasets, data merging skill is essential.
- Address database management up front to include properly coding and defining of the variables (Student Affairs Leadership Council, 2012).

In sum, as Figure 1 illustrates, consolidating and merging data is a massive undertaking for alumni tracking, especially when longitudinal data will be collected and other student demographic and performance variables will be included.

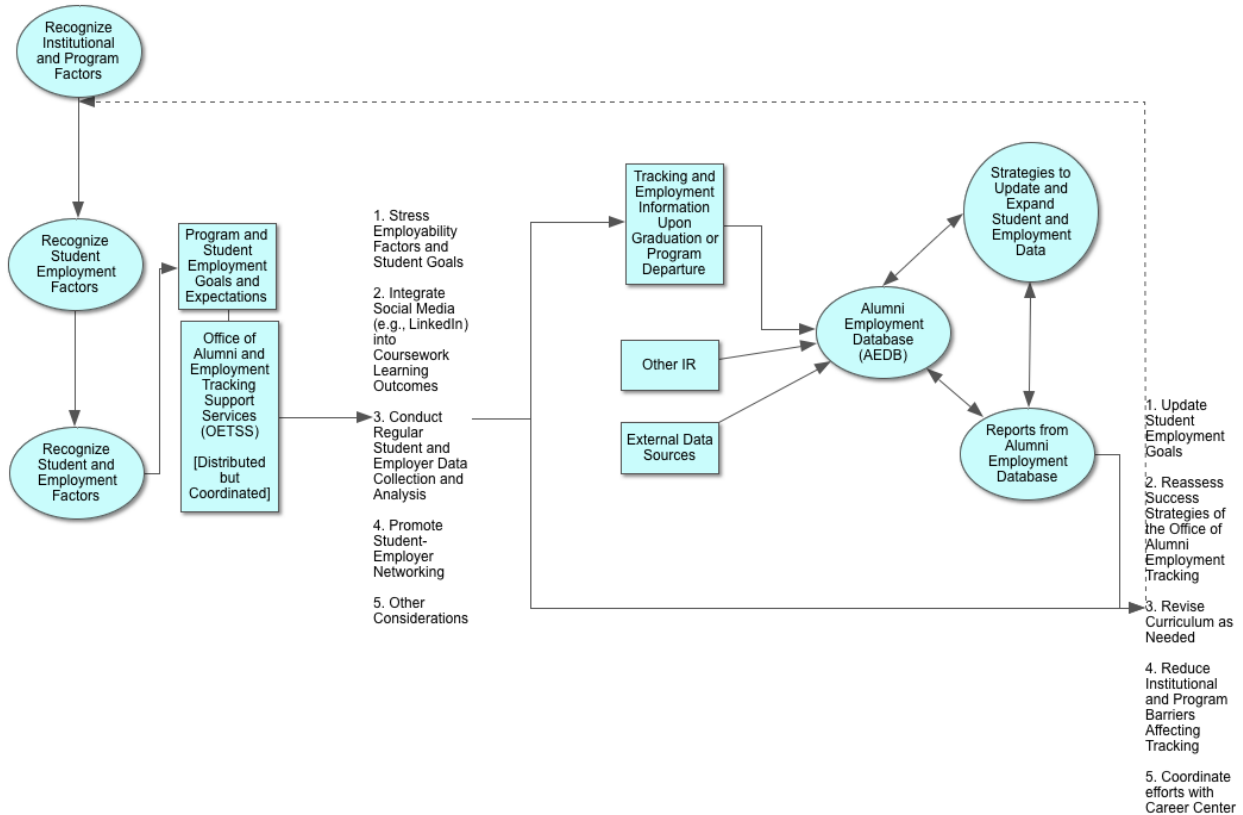


Figure 1. Overview of Alumni Employment Tracking System

Figure 1 features an exploratory effort to better develop strategies for developing and maintaining an alumni employment tracking system. Beginning on the far left of the figure, the system recognizes that there are numerous institutional, program, and student factors at play that may affect student employability and the program's ability to track alumni and employment information. These factors are likely to vary across Institutions, Programs, and students. But recognizing those that are most important is a useful step in development an alumni/employment tracking system.

Next, it is important to clarify student employment goals and expectations as early as possible as it is useful input for the Office of Alumni Employment Tracking Support Services (OAETSS). Having an OAETSS can better organize and integrate the tracking effort—its size, goals, and activities will be largely determined by the resources the institution and/or program has to support it. But it will have as a key responsibility the development and management of the alumni employment database (AEDB).

While the students are enrolled in the program a number of key activities might be highlighted:

- Stress employability factors and student goals;
- Integrate social media (e.g. LinkedIn) into course work and activities;
- Conduct regular student/employment data collection and analysis; and
- Promote student/employer networking.

Depending on the program's learning outcomes, student expectations, and availability of employment opportunities, other factors may be considered as well.

Upon graduation or otherwise leaving the program the OAETSS will have a considerable amount of data regarding the student and employment. These data (as well as other institutional and/or program data) are organized into an AEDB. The OAETSS staff will develop strategies and techniques to expand and update the database and otherwise maintain contact with students that have been associated with the program. These strategies and the information in the database will result in a range of reports describing alumni and their employment.

The regular updating of the database and its reports can then be used to:

- Update student/employment goals
- Reassess the success and the strategies of the OAETSS;
- Revise curriculum and learning outcomes as needed; and
- Reduce institutional and program barriers affecting the alumni and employment tracking process.

Depending on the individual institution, program, and student needs and activities, the reports from the database may be used to inform and revise other aspects of the educational experience.

The promising approaches outlined in Figure 1 with its corresponding narrative are intended to stimulate additional ideas and strategies for an alumni employment tracking system. We expect to continue work on Figure 1 and to continue refining and testing it in the future.

Reporting Program Complete Data: Exemplar Results And Promising Practices

In this section, we present techniques used for displaying and presenting alumni complete data results. We generated many useful visuals for distribution in reports to alumni, faculty, and the BOG, of course, about our complete outcomes. We also share information about free software employment locations by major (such as Google Maps) that we leveraged to display alumni data.

Q1 – What percentage of CS, CE, and IT undergraduate majors are employed after a year?

Of the 325 students responding to the survey, 308 (or 94%) reported employment information. Of the 308 alumni who indicated that they were employed, 292 or 95% were employed full-time, while 16 or 5% were employed part-time. Of those reporting, 87% stated that they were working in a field related to their major and 2% indicated that they were self-employed. Additionally, 11% of responders indicated that they were enrolled in college.

Q2 – What are alumni salaries?

Figure 2 depicts the percentage of responders (N=306) in each salary category.

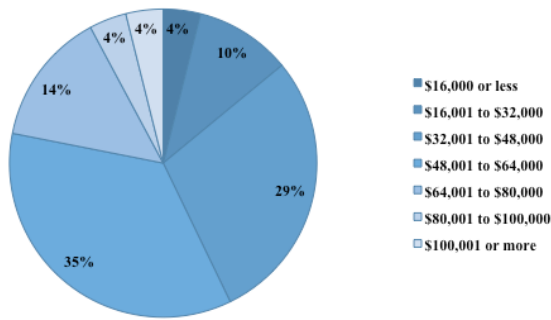


Figure 2. Aggregated employment data

As Figure 2 shows, 35% (n=107) were making between \$48,001 to \$64,000, 29% (n=89) were making \$32,001 to \$48,000, 14% (n=43) were making \$64,001-\$80,000, 10% (n=31) reported \$16,001 to \$32,000, and 4% (n=12) indicated they are making \$16,000 or less. The two highest salary categories, \$80,001-\$100,000 and \$100,001 or more each had 4% of respondents (n=12 each). As Figure 2 shows, graduates of the three programs tend to secure jobs with salaries in excess of \$32,000 per year.

Q3a – Where are our students employed?

This research question resulted from the Board of Governors' interest in where graduates were employed. Figure 3 illustrates U.S. locations of all CE, IT, and CS program graduates who responded to the survey (N=287).

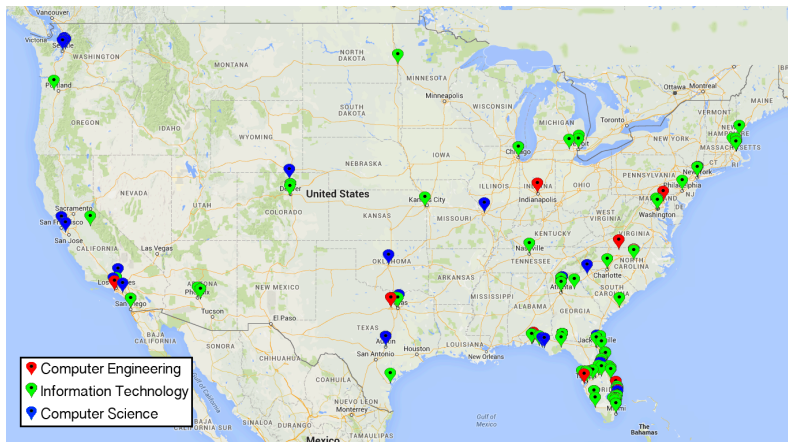


Figure 3. Employment locations for all CE, IT, and CS graduates (N=287)

As Figure 3 shows, over 80% (n=230) of graduates are employed on the east coast, 19% (n=55) employed in mid or western U.S., and 1% (n=2) employed overseas.

Q3b. Are they in Florida?

Figure 4 illustrates aggregate in-state (Florida) CE, IT, and CS job placement data from summer 2013 through summer 2015 graduates (N=158). Figure 4 depicts the employment locations of graduates who stayed in Florida.

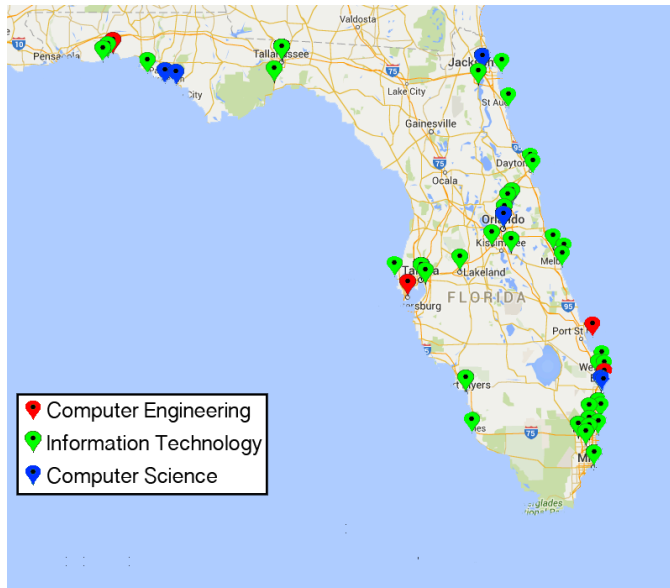


Figure 4. In-State Employment Locations by Major (N=158)

As Figure 4 shows, 55% (or 158 out of 287) all FSU CE, IT, and CS alumni were employed in Florida, with the highest concentrations (n=132) employed in central and south Florida. Of those living in North Florida (n=26), we found that 95% (n=24) of them resided in a major city (e.g., Jacksonville, Pensacola, or Tallahassee), or in a tourist city such as Panama City. The remaining 2 graduates live in small towns or rural locations.

Implications for Institutional Research & Academic Unit Productivity

The *New Vision for Institution Research* (Swing & Ross, 2016) provided a new model for addressing postsecondary education's real world management needs, with a focus on empowering decision-making at the tactical and operational levels. Higher levels of accountability are needed, especially in technology and computing fields, which are projected to be among the fastest growing occupations by 2018 (Castellano, Sundell, & Overman, 2010). The U.S. Department of Labor (2013) has also highlighted the urgency to encourage more college-bound students to pursue computing and technology studies by indicated that computer jobs are expected to increase by 18% by 2024.

Increasing demands for students in STEM fields, and a greater need to account for the progress that institutions are making in STEM workforce goals, suggests that alumni tracking is likely to become even more formalized and efficient at postsecondary institutions, thus requiring targeted measures to obtain greater alumni participation. Based on the experiences detailed in this paper, we recommend that using multiple methods, including social media, to reach alumni in technology and computing fields. Institutional efforts to increase current student participation in social media, such as LinkedIn or Facebook, through assignments in mandatory courses or through university policy are some examples that are crucial to harness the information contained in social media for alumni tracking. Alumni response rates to post graduate surveys may also be enhanced by using social media outreach, although it can also be argued that regardless of the means, alumni completion outcomes are best gathered best by individual departments.

Our work with alumni suggests that to determine program effectiveness and identify needed curricular modifications, student employability must be a departmental priority. Programs that are able to closely link degree attainment to employment will have a competitive advantage, such as high levels of student enrollment or alumni-to-donor conversion. With the high number of jobs available in STEM and the low number of students to fill them, STEM programs have the additional responsibility to promote, support, and measure employability.

Alumni tracking is costly in time, effort, and tools. Institutions must consider the time and money required to properly implement an effective-alumni tracking program. The FITC project dedicated two faculty and five students to its alumni tracking work. Institutional researchers may be called on to lead efforts in determining whose responsibility it should be to collect, maintain, analyze and report program completer outcomes data. Updating alumni records (e.g., emails, phone numbers, and social media contact information) and then conducting necessary outreach for the purposes of collecting workforce-related data, in particular, may need to become an institutionally accepted and formalized practice. Institutions may want to consider augmenting departmental budgets in STEM fields to provide resources for alumni tracking.

Based on the FITC cost data, members of the study team contacted two community college IT programs and two university IT programs regarding the costs of follow-up. Three of the four programs were unable to mount successful alumni tracking efforts because of “excessive costs.” The fourth program had maintained a successful alumni tracing effort but at “considerable” cost and with significant effort. Programs will need to determine their perceived costs and benefits from alumni tracking and the degree to which costs for such tracking are acceptable.

Finally, the FITC team recognizes that the promising practices reported here are just that – promising practices’ they are promising practices here at our program in light of situational factors at play at FSU. Given that other academic programs may have contexts and situational factors different than those here at FSU, some of these promising practices may have more or less promise in other settings.

Future Directions for Research

In this study, we provided promising practices for improving data collection, analysis, and reporting to consider when collecting program completer outcomes for an alumni-tracking program. Our experiences also suggest that there is much to be learned about alumni tracking as a form of institutional research. In a broad sense, future research on improving alumni tracking should focus on identifying institutional models to engage current students once they become alumni.

Other directions for future research include pursuing additional research questions such as:

- What types of incentives are most likely to appeal to alumni and how should these incentives be promoted throughout the data collection process?
- Which program completer performance metrics supplement feedback on the success of academic programs and, in conjunction with other performance metrics, can be used to make meaningful curricular and co-curricular modifications?
- What types of policies could institutions implement to increase alumni engagement and post-graduation data?

- Which leadership and technical competencies must faculty and staff have to lead outreach activities?
- Which activities student/faculty (or staff) activities motivate students to remain engaged and share employment information once they have graduated?
- How can multiple social media platforms be used to bolster alumni outreach and participation?
- What aspects of social media outreach are most effective for increasing participant response rates?
- What are the actual costs for maintaining a “successful” alumni-tracking system on an annual basis?

Conclusion

In this paper, we detailed the development and implementation of our alumni employment tracking system, as well as its early results. Through operation of the system we created for our CS, IT, and CE program graduates, we developed, refined, and proved practices to tackle the often-intractable challenges of following program completers after graduation. Our aim in this paper was to distill techniques and suggestions that may enhance the ability of institutions to link their programs to tangible outcomes such as employment and salary level. The need for trained technicians to meet the demands of even today’s workforce requires that postsecondary institutions devise measures and collect data on student employment. Effective STEM programs must be proactive to ensure that their graduates have a role and place in contributing to our current and future economy. Such programs can be strengthened with an alumni employment tracking system.

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Appendix A. Completer Outcomes Questionnaire

Required Questions**Employment**

1. Please check the box(es) that describe(s) your current status.
 - I have a full-time job.
 - I have a part-time job.
 - I am not working because I choose to be unemployed.
 - I am not working, but not by choice.
 - I am not working (no reason provided).
2. My job is located in _____ (City) _____, _____ (State) _____.
3. My job is in a field related to my bachelor's degree. Please check Yes or No
4. My total annual salary is:
 - \$16,000 or less
 - \$16,001 to \$32,000
 - \$32,001 to \$48,000
 - \$48,001 or more

Further Education

1. I am enrolled in college Full-time Part-time
 - a. What is your major? _____
2. What level is your program?
 - Just taking classes
 - Associate's (two-year) degree or less
 - 2nd bachelor's degree
 - Master's degree
 - Doctoral degree
 - Other graduate degree (J.D., Ed.S., etc.)