Getting a Degree in Cloud: The New Normal in Staffing and Education

by Kevin Loney

With the widespread coverage of recent college admissions scandals, schools whose actions merited positive attention may have slipped past unnoticed. If we'd been paying attention to the next wave of changes in education, the news vans would have found their way to:

- Agnes Scott College, Decatur, Georgia
- Mills College, Oakland, California
- Scripps College, Claremont, California
- Northern Virginia Community College, Springfield, Virginia
- La Trobe University, Victoria, Australia
- University of New South Wales, Sydney, Australia
- Northwest Vista [Community] College, San Antonio, Texas
- Bay Path University, Longmeadow, Massachusetts
- Heidelberg University, Tiffin, Ohio
- George Mason University, Fairfax, Virginia
- Miami Dade College, Miami, Florida
- The Louisiana Community and Technical College system
- Theodore Roosevelt Senior High School, Los Angeles, California

Each of these schools is part of a larger effort to augment the development of students in ways that benefit both students and the companies that will be lined up to hire them. And they're doing it in ways I believe puts them at the forefront of corporate techology leadership development, and addresses the recruiting risk every company faces.

Why change student development, and openly align it with corporate recruiting? Student's vocational development has always aligned with corporate recruiting, at least tacitly; college admissions departments actively advertise the percentage of their graduating classes that get jobs in their chosen fields after graduation. When the aeronautics industry needed more aerospace engineers, the large aerospace companies gave grants for research facilities to universities and waited for the interested engineers to graduate. What's happening now is a repeat of that pattern: the industry-sponsored development of specific curricula focused on technology stacks like cloud administration, not just for professional certification but as full accredited degree programs.

Throughout this article you'll see links for further reading about specific efforts. For example, this first set leads off with La Trobe University's (Victoria, Australia) partnership with Amazon to offer a bachelor's degree in Applied Cloud Technology:

AWS and La Trobe Offering Applied Cloud Bachelor's Degree

Data Driven: Scripps Integrates Computer Science Skills into a Liberal Arts Curriculum

Agnes Scott College Selected for Google-Funded Pilot Program

Google, Heidelberg partner for computing courses

NVCC Collaborates with AWS to create Associate's Degree with Cloud Computing Specialization
and its sequel in June 2019:
George Mason University and Northern Virginia Community College Announce the Region's First Bachelor's Degree for Cloud Computing with AWS Educate

To understand the criticality of the solution needed, we have to start with clarity on the problem being faced.

A 10-Second Summary of every Mass Market Management Book

In most management books there comes a point where the authors provide guidance that (generalized for brevity) echoes this:
To be successful: get the right people in the right roles,
and have them focused on doing the right things.

That's the core of most management books in a sentence; directing the corporate focus and measuring improvements is the subsequent work of leadership. If that guidance seems simplistic, the question should arise: *why does any company fail*? Why do some companies demonstrate leadership in their industries year after year, either by introducing better products, having better support, having fewer defects, or providing better value for commodity services? And why are other companies seemingly unable to improve themselves — where do they go wrong?

Let's take a small step back and visualize the company. When thought of as part of the business's process flow, the corporate headquarters building operates a set of business functions (strategic planning, accounting, marketing, sales, engineering, etc.) with inputs and outputs, and the people who work in the company are executing those functions. How do you build the company's staff? When viewed this way they are not just the employees — they are the people who control the company's key business functions as part of its overall process flow.

The staffing consideration is critical because of the nature of the outcomes you need. You're not looking for people who can do a task; you're looking for people who will control the company's ability to grow and thrive — to be the right people in the right roles. Those people will need to drive the company through changing times, grow into new roles, hire new leaders, and steward the company and the other staff members past whatever obstacles are faced. A common thread in management books is that you cannot teach someone to have the right combination of skills, intellect, curiosity, leadership, integrity, communications, empathy, and commitment; you can augment those characteristics through training and practice but when

hiring your staff you need to find those candidates who already demonstrate they are the right people.

Taking flight

For example, perhaps you start a company in your garage. You build, from pieces you design, an airplane. You design it, you select all the materials, and you assemble it by hand. A friend sees your work and asks you to make a similar plane for her to purchase. Now you want to have time to show your plane to other prospective customers while other people under your direction build more planes following the process and design you have already laid out. How would you staff that?

You'd want to find people who had knowledge of the technology involved. They wouldn't start the job knowing your specific design, but your immediate need isn't design; it's the ability to use your design to assemble, test, construct and deliver a finished product, along with providing customer support, accounting, and project management. So you advertise for people who have such skills. You know that you will need to teach the specifics of your plane to anybody who comes on board for at least a plane or two, after which you could hand over the controls.

Meanwhile, manufacturing costs or availability for certain parts may vary widely, so you will need someone to work with you on enhancements to the design, and another person to work on the user controls, and another on flight simulations. You've split the work into a number of discrete functions (architecture/design, development, manufacturing/delivery, testing, analysis) and the leader of each of those functions needs to work well as a solo practitioner and as part of a cohesive end-to-end team (to diagnose flight control issues, for example).

So you have a defined need for staff — people who reflect the diversity of cultures and life experiences and backgrounds you recognize as vital. People who are highly skilled, have experience in the industry, are naturally curious, constantly think about how their component is used by customers, are leaders, work well independently, communicate with integrity and empathy, own their work, and work well as part of a team. *And they have to have those attributes, many of which have nothing to do with airplanes, the day they walk in the door*. *Any compromise on those attributes compromises the future of your company.*

Given this demanding list, it's easy to see how hiring managers drift from an ideal description of the perfect candidate because of constraints driven by deadlines, funding, priority, etc. The people you will hire are the most important part of your organization — they literally make the company fly or fall. How are you planning to staff them in the first place, and then maintain a steady flow of personnel who can come aboard and help the company continue to grow? If you somehow succeed in completing the first round of hires without compromise, some other part of your processes will constrain those employees' productivity; you'll have a backlog for development, or testing, or customer support. You need a hiring process that solves your tactical staffing need and your strategic requirements, wave after wave. The more successful your company is, the more of these hiring waves you will need. And while you're waiting for those staffers to join, there is a constraint somewhere in your current active business processes, which highlights this revelation about staffing:

Every time you reach out to fill a critical opening, your business process slows. And increases in the number and criticality of your openings are part of your business plans.

Most business plans call for expansion in the business, which requires additional leaders to drive the company forward, managing both the legacy business and the strategic efforts. When those positions are unfilled, work slows. In some cases the constraint is not obvious; for example, a university that fails to hire professors to teach a course doesn't offer that course, and the impact is not immediately obvious when the class is not held and a classroom sits empty. But if that class is a requirement for a degree program, or if students transfer to schools that can routinely offer more advanced course offerings, the university's students and its business are impacted.

Fighting for survival

Business slowdown might only impact the non-urgent work while your current staff keep the tactical efforts on schedule, but those impacted strategic efforts are critical for your business's ongoing success. The slowdown may show in subtle shifts — new product launch delays, deferred product feature innovation, senior personnel doing non-leadership work, or reduced time spent working directly with customers. The more your business grows, the more critical your hiring process becomes, and the more the company's growth is slowed by any absence of leadership and skills.

To fill those hiring needs, you look to the available pool of potential hires. Multiple companies who need the same constrained resource (the set of highly desirable skilled leaders) are competing against each other. The resource pool's growth is linear, while the needs grow exponentially and exceed the population available.

In this fight, you have options; the most common choices are, in order:

1. Stay the course, changing nothing.
2. Buy staff augmentation services to supplement staff positions.
3. Become a "buy" rather than "build" shop, changing your skill set need.
4. Change your resource pool completely to address your risk.

These are not always actively chosen; sometimes they are inherited from prior leaders. It's critical to know which path you are on.

1. Stay the course, changing nothing:
"We'll keep doing exactly what worked back when we were smaller. If we just had that same dedication to excellence…"

To stay the course means to accept the status quo — to accept the constant risk to your business that comes with a persistent risk to maintaining a full complement of qualified leaders across your company. To stay the course is to know you've built constraints into your operating model and you will most likely never have enough high performing leaders in all roles at all times to drive all tactical and strategic efforts without compromise. The available population of highly desirable technical leaders in the marketplace that will ultimately join your company will never satisfy your demand.

The only consolation is that this describes many of your competitors as well. Companies that start out small with a set of do-everything people may find they cannot replicate that delivery velocity or innovative spirit or team atmosphere when the company grows. To address this, they hire people from the company next door, and then that company hires people from the company next door to it, and the people keep going around in a large circle through the office parks. To stay the course is to assume that the carousel of talent moving from building to

building will provide enough skill and leadership to push your company to the next level when they arrive at your building.

Regardless of the approach chosen, leaders have an obligation to their peers, shareholders, and team members to accurately assess and communicate the risks to their plans so timelines, budgets, and expectations can be properly evaluated. And if they see they are not going to achieve their goals, they must escalate the issues and take steps to address them.

2. Buy staff augmentation services to supplement staff positions.
"Let's change the equation in our favor: expand the available resource pool. Let's stay a 'build' shop, but bring in temporary outside resources to reduce our risks."

Staff augmentation efforts involve bringing in individual contractors or entire teams of outsourced personnel to work on specific deliverables. Is it possible for such efforts to overcome their risks and costs, delivering what you need? Sure, provided you have planned for those risks and implemented controls and processes to make the best use of the personnel. For staff augmentation proponents: are you outsourcing tasks, teams, or projects? Are you using agile or waterfall development approaches, and how well-defined and static are your specifications? Will you perpetually need a team to support the solution being developed? Are the outsourced team members local? Are you advocating any compromises on cost, quality or alignment with your core architecture principles? Are you empowering those teams to drive enhancements to the design, manufacture, testing, or assembly processes so there is a feedback loop in the development process?

The use of staff augmentation services, whether via a local or remote providers, adds risk along with the projected benefit to delivery velocity and product quality. The underlying belief behind staff augmentation work is that tasks can be designed so that resources are fungible, and the staff's level of intimate business knowledge and ownership/stewardship is less important than the skill set itself, or that the outsource personnel will display that level of stewardship even though they are not direct employees of your company. A company that relies heavily on staff augmentation personnel to perform the bulk of its tasks will find typically itself with a majority of its contractors operating in set roles for years, performing their roles exactly as they did when they first came aboard. In that model, the rate at which the business functions improve slows significantly; the enterprise becomes a variant of the status quo model, with an expanded staff that is focused primarily on task execution. To address strategic planning needs, you will need to continue to specifically recruit people for the strategic work that guides your product roadmap and lifecycle, often resulting in an increase in your total headcount costs.

3. Become a 'buy' rather than 'build' shop, changing your skill set need:
"We can't find the right people to develop this for us. Can we change the need? Can we find a product that is similar enough to our business processes so we can avoid building everything?"

Many companies build their own products when they are young; in the software field they often use open source components during startup. There's a defensible financial reason for this approach: they can't afford enterprise licenses for proprietary software for business workflow management, communications, analytics, graphics tools, and the like.

The pain points of the build-everything approach are felt fairly early as tools with scant support require high levels of technical skill from developers, so the staff needs a high level of experience in all roles from architecture through testing and deployment. Upgrades and

mandatory security fixes often require full outages, impacting customers or internal controls. As new and more demanding customers are added to the business portfolio, customizations of proprietary deployments require even more technical skill, limiting how fast new customers and products can be added by the business. The reliance on the original toolset, and on the internal solutions built using these tools, becomes a constraint on the growth of the business as changes grow riskier and more complex.

As the company attempts to grow further, the availability of key personnel to maintain legacy applications and also roll out even more advanced new solutions is a limiting factor for business expansion. When your technical leaders can't escape supporting legacy systems, it's time to question your company's function: do you build solutions, or do you buy and deploy solutions that other companies build, adding value in that process? Why not focus on simplifying your business operating model and deploying pre-built applications with as little modification as possible to the inherent business model built into the applications? Instead of working through legacy code bases, you'd focus on the interface components to the code base, which is a much more limited set of options to work with. Since you'd likely be using a commercially available product, the availability of personnel to support that product would be greater across the industry, lowering your staffing risk. You're supposed to be producing airplanes, not custom billing systems.

In the 'buy' model, your personnel needs shift to application support personnel for a broadly available purchased product. Any recruiter could advise that this is a much larger pool of more easily identifiable candidates, with a better defined range regarding the number of years experience per candidate. Your staffing risk for many of your positions is lowered, as the number of highly technical staffers needed to build software decreases. You'll still need a pool of architects and leads to integrate and deploy applications.

The downside of this approach (other than the dependence on a proprietary software license) is that the earlier set of developers and designers who joined with the intention of building solutions may leave the company, taking their technical skills with them. But if the company's way of doing business changes, you need to go back to the original question: do you have the right people in the right roles, focused on doing the right things? If the company's functional output changes, it stands to reason that the personnel doing it will change, and that is part of the company's evolution. If the earlier teams are to stay around they will need to effectively take on different job functions.

4. Change your resource pool completely to address your risk

"We have to change everything about how we play this game. And we have to start by admitting that unless we radically change how we play it we will never survive."

This is the last option listed for a reason: it's the hardest to start, longest to implement, and the one most companies won't try unless they lead a market, have established a market, or are appropriately desperate. If it is properly executed it has the biggest returns by far.

In every example to this point, you are making an investment; you are spending money on new hires, or contractors, or software programs, or recruiters, or agencies. Traditionally that cost is thought of as an expense. But rather than thinking of that as an expense, think of it as a capital investment for which you are expecting returns. You are spending money, so what are you hoping to buy with that investment? What is your goal? And what is the corporate goal?

The corporate goal is not to hire people, or to fill seats, or to achieve a headcount target number; those are all tactical, internal-facing metrics rather than strategic, customer-impacting

measures. What are you trying to achieve, and how can you do so in a way that moves your company from good to great? What allows your company to thrive while the generally available resource pool does not increase at the same rate as your demands increase? How can your corporate goals — profits, return on equity for shareholders, corporate citizenship, industry advancement, geographic expansion — be met?

In its full implementation: *Build your own pool*. Control your own destiny. This does not mean to implement a mentoring program or a set of once-a-month training sessions for new hires. This is an intensive, full-company effort integrated with external education institutions to select, develop and guide candidates before they ever start working for you, and then keep them on specific personal development paths after they start. Rather than relying on publicly available personnel who have gained experience at competitors, you will be systematically educating and developing people who meet the demographic profile you want. This requires a top-down commitment from corporate leadership to own the active stewardship of the next generation of leaders as a core part of their jobs. Those executives are the ones who own the current operational risks, and these actions can alleviate the longterm risk.

One option available is acquisition: fund and acquire startups, or merge with smaller companies to acquire the best staff you can find. This is certainly a popular approach, and one that has a clear payoff as the capital investment yields product rights and access to intellectual property owned by the acquired company. It assumes, however, that the capital available for acquisitions is always available and that the startup pool is constantly refreshing. But in a prolonged recession, when you need to seed your company's growth the most, there may be few startups to acquire and not enough cash on hand to win a bidding war for the best.

To achieve a sustained level of intellectual horsepower and leadership in your company, you have to plan for it. You may get lucky when looking for resources in the open market, but getting lucky on random connections is not a reliable strategy and the risks increase as the competition for critical resources increases. Can you identify candidates early and then bring them through a specific path of education and opportunity? Can you create your own minor league?

Building Sustained Intellectual Horsepower

To get the right people in the right roles, you first have to get the right people.

What if the company is not staffed from open market hires, but rather is staffed primarily by the careful promotion of students who are brought through college courses and graduate/professional degree programs with the explicit intent of applying them to future positions within your company?

There's a lot to unpack there. We start by bypassing the most expensive, inefficient and poorly controlled portion of the HR process: the hiring pool. What if we could identify candidates early in their careers, after their high school or early college successes? Corporations already do this, partially, by holding scholarship essay contests, judging science fairs, awarding merit scholarships to promising students, and providing internships. In some cases this effort is coordinated, but often its focus is unclear; is the company giving a scholarship grant as part of good citizenship, or is it part of talent identification very early in the hiring process? Has the goal of this grant changed since this scholarship was first given? What happens next?

What happens to the students after they have been identified and won those awards, and how are they tracked, mentored and supported? In the existing system most students select their

colleges and courses and then resurface several years later as they enter the job market. Then they find out that they'd be better hiring candidates if they had stayed on to get an advanced degree in statistics, or added a user interface design course to their studies, or spent significant time improving their writing — and now it is too late to go back and change their coursework. What if this guidance could have been given to the students four years earlier, and sustained throughout their education? And going further, what if the costs associated with specific requirements (such as advanced degrees, or specific undergraduate degree programs) could be at least partially borne by the company so there is much less financial risk for the student? Just consider the edge case: Would a top student accept a tuition-free college education with a guaranteed job at the end of a university program instead of a six-figure tuition expense with no guarantee of employment afterward?

Companies are already pairing up with colleges. These aren't one-off outreach efforts; the first link in the following set provides a good overview of the lessons learned and the ways those lessons are being applied to subsequent programs:

Google Machine Learning had a Bumpy Takeoff, only Upwards from here

UNSW: SALESFORCE AND DATARATI LAUNCH A 'BOOT CAMP' FOR GRADUATES
Note: *"Salesforce and Datarati plan to rollout the Marketing Cloud Boot Camps at RMIT University and East Point College of Engineering in Bangalore India in 2019"*

Northwest Vista College Becomes First Amazon Web Services Academy in South Central Texas
"The courses will be part of the degree requirements in the Network & Cloud Architecture AAS program at NVC."

Bay Path University Partners with Google for Applied Computing Series

Miami Dade College to Launch Associate Degree and Certificate Program for Cloud Computing in Fall 2019

Note that although the Google seminars are primarily offered at small women's liberal arts colleges, they are open to any participants, and public data shows majority female coed cohorts. Amazon's approach has been to integrate full semester-length courses into the existing course catalog, creating opportunities for new majors or minors to be designed. Google's seminars are usually 10 weeks in length and are generally not part of degree programs yet.

Who's Next?

There are already efforts linking corporations with schools across the country in off-semester programs and special courses. I think the future options are exciting to consider once the initial relationship with the schools has proven successful. What if a company doesn't just provide a few courses' worth of material but actively partners with a college? What if an industry provides trainers to train the professors, and computing lab space (on, say, a cloud) along with access to a network of instructors covering the same courses? What if that material was robust enough to support a designation as a major for an associate's or bachelor's degree? What if a school became a flagship school for a company's technology stack? *These first steps are happening already, and it is just a matter of time until a higher level of integration is achieved*.

What if the entrance into the company-driven programs at the colleges was established during the college application process, and a set of students went through it together? A company's preferred course catalog could be merged with existing curricula at a supporting university. Students would still have time for electives, and even those could be guided or open; future business analysts could study human physiology to learn how people interact with screens, physicists could take art classes, acoustics engineers could play brass in the marching band. Some students would be ready to enter the company immediately upon completion of an undergraduate degree; they would then take on a role for a set duration before having a sabattical to go back to school and work toward an advanced degree. Whenever possible, that postgraduate work would happen at the same campus as the undergraduate work so the current and former students in the corporate program could support each other. (Note that these would be full degree programs, not short code academy efforts.)

What would the students get out of this? A guaranteed job with a valued skill set coming out of college. Reduced or eliminated tuition and job stress. A campus-based college learning experience. Life skills mentoring and professional guidance. A promise of continued education and growth at a company that is actively investing in their future. Respect. Visibility. Relevance.

What would a university get from this? A steady flow of highly qualified students, with a persistent corporate presence that makes other students vie for positions in that same cohort, pushing everyone higher. Enhanced metrics for average four-year graduation rates, incoming student standardized test scores, and post-graduate employment rates. Higher number of applicants for its programs across the board. Greater attractiveness for the community in general as a site for highly skilled jobs.

And what would the company get from this? The ability to plan the staff of its future leadership now — and to have those people working together in class for four years *before* they set foot in the office park. They are a deliberately diverse group that has learned together, worked on class projects together, given presentations, argued in philosophy classes, struggled through tough times, cheered together, and succeeded together. They've done business case projects based on your company and its prospective ventures. They have questions they want to talk with you about, and they have well-formed ideas that you should listen to. They are ready to contribute. And they don't even have an ID badge yet. They are a bargain. And what about extending that diverse population to explicitly include veterans? Well, Amazon's HQ2 workforce management lead is an Army veteran who in the recent past has led efforts to open the hiring door to as many veterans as she can so that population should remain in scope.

In this model, the two sides would invest in each other: the students make a commitment of some length of service to the company, and the company makes a commitment in terms of professional education and career management. Together they eliminate the bulk of the hiring risk for the most critical roles, which in turn is the highest risk component of the business. External forces may change things — economic downturns, corporate takeovers, copycat systems poaching candidates, etc — so some might argue to keep the pool of candidates as small as possible. But if the economic system were under stress, you would want the largest sustainable pool of strong candidates available, and then let that next generation of leaders lead the way.

Who would want to invest in that? Aside from the schools and companies already listed in the linked articles, there's the state of Louisiana. Northern Virginia Community College had already added the Amazon courses to its catalog when Amazon was looking for HQ2, its second headquarters site. NVCC's program supplemented the graduates of other local universities,

creating a pipeline of candidates to go on to study cloud technologies at George Mason or work at Amazon's HQ2 headquarters in Virginia.

Louisiana's HQ2 bid was not accepted, and they thought about what to do before the next such contest (see link for full article):

LOUISIANA COMMUNITY COLLEGE SYSTEM, AMAZON TEAM UP FOR EDUCATE CURRICULUM
Lauren Heffker, LSU Manship School News Service Published 8:46 p.m. CT May 8, 2019
BATON ROUGE — The Louisiana Community and Technical College System is partnering with Amazon Web Services to implement the tech company's Educate curriculum, Gov. John Bel Edwards announced Wednesday.
The community colleges also will collaborate with Amazon to offer an associate degree in cloud computing.
"This is all about the talent pipeline," Edwards said. "We want that in Louisiana, too."
…
Edwards said tech jobs often pay twice as much as other types of jobs and that the tech industry needs more women and minorities.

The emphasis on community colleges and women's liberal arts colleges (Mills, Agnes Scott, and Scripps are women-only; Bay Path is women-only in its undergraduate college) is intended to bring these opportunities to a deliberately diverse pool of candidates. Those efforts do not have to stop at the college level. Every college has a chance to reach out to its local high school population, as the Los Angeles Community College system demonstrated. Launching a certificate program with a single outreach request per school, here's what happened in August 2018 (see the link for the full article). Check this out:

CLOUD COMPUTING CERTIFICATE NOW AVAILABLE THROUGH 19 LA COMMUNITY COLLEGES AND AWS EDUCATE
The California Cloud Workforce Project ("CA Cloud"), a consortium of 19 LA County community colleges and their sister high schools, today announced they will offer a Cloud Computing Certificate…

The CA Cloud curriculum will also be shared globally through AWS Educate – along with materials contributed by Miami Dade College and British Columbia Institute of Technology – so that institutions and educators around the world may follow a similar model to develop and implement cloud computing-focused programs…

As part of this initiative, each community college is working with at least one high school in the greater Los Angeles area, including those in economically disadvantaged communities, offering concurrent enrollment in the 15-credit certificate program and other support, such as professional development opportunities like curriculum development workshops and AWS trainings.

For example, SMC collaborated with Roosevelt High School to offer dual enrollment opportunities during the 2017-18 school year.
Due to overwhelming student demand, SMC hired additional faculty and expanded the program from two sections to seven.

That's what it looks like when you actively lead in your area and when you plan for the future of your company, planting seeds in the places that need growth the most. You launch one community college class and you get the next wave along with it. You never know where you'll find the right people.

-Kevin Loney, June 2019.