Innovative Approaches to Building Comprehensive Talent Pipelines: Helping to Grow a Strong and Diverse Professional Workforce

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ABSTRACT

The world today is constantly changing requiring organizations to adapt quickly and seek expertise to help meet the demands on their business. There are many workforce challenges that organizations seek to overcome, and one of the hardest things to do in modern corporations is to keep the talent pool young and vibrant. Early career hires tend to bring new and exciting ideas into play that may not even be considered by their more seasoned peers. The challenge with early career hires, especially in the Science, Technology, Engineering & Math (STEM) career fields, is the extreme difficulty in finding candidates who, not only have book knowledge, but also have hands-on, real world experience. Statistics show that this is a real concern to professional workforce employers. In this presentation, we highlight a model aimed at adopting new approaches for seeking and evaluating high quality candidates for on-boarding, conducting interviews and hiring to build a corporate talent pipeline. We discuss the model as it relates to recruiting, training, competition-based interviewing and providing hands-on work experience toward helping to build strong professionals in an organization. We conclude by highlighting several examples of successful approaches and their outcomes.

Keywords: Workforce Needs, Talent Pipelines, Early Career, Interviews, Recruiting, Training, Challenges, Competitions, Learning Paths

1. INTRODUCTION

In this paper we highlight an approaches for building corporate talent pipelines in the Scence, Technology, Engineering and Mathematics (STEM) career fields by conducting corporate initiatives aimed at adopting new approaches for seeking and evaluating high quality candidates, conducting interviews and hiring [2].

In our experience, we have observed that highly performing teams are the cornerstones for today's professional workforce. There is a need in industry to continue to grow and retain career-oriented professionals as part of professional workforce teams [1].

However, organizations typically struggle with the following issues:

- The identification and hiring of top talent that have a balance of technical, soft and teaming skills
- The development of learning paths for employees to grow in their career, become highly competent and recognized in their field, and remain motivated to be a valuable asset for the organization
- The integration of early career employees (and mindsets) into the existing workforce

It is for these reasons that corporations seeking to stay ahead of the curve may want to consider the model discussed in this paper for talent pipeline generation.

2. BACKGROUND

In a survey conducted by the on-line human resources company, Bamboo HR [7], we find that:

- 76% of new hires expect on the job training in the first week of employment.
- They want to learn how to do their job and the inner workings of your company.
- In short, they want to start doing meaningful work and contribute as fast as possible.

Unfortunately, statistics show that the majority of new hires quit in the 1st six months of employment. Not only are new hires deciding whether or not they want to work for your company, but they are deciding whether they like the job that they have accepted. Of those who do leave there job early, most did so in entry and intermediate level

positions 43% in entry level and 38% in Intermediate level positions. The data shows that employees often leave their job quickly due to:

- Being Overwhelmed with the work
- The Job just was not fun enough
- The employee felt Under Qualified
- They may have felt neglected or Under Appreciated

But most noticeable, the three leading indicators are:

- "Changing their mind on the type of work they want to perform"
- The work was Different than what was expected
- And they felt like they didn't receive enough training

This presents a pattern that is emerging that highlights a lack of training, and specific job expectations are very important to new hires. The statistics we examined help us to understand what new hires need to be successful. Next, we researched data that concentrates on understanding the cost of making a hiring mistake. In a recent Career Builder survey [8],

- 41% of companies surveyed say that a bad hire cost them at least $25,000
- And 25% of companies reported that a bad hire cost them at least $50,000

But the costs go beyond just financial. The data also highlights direct and indirect ways companies have reported that they have paid for hiring the wrong employee. They include from high to low:

- The loss of Worker Productivity
- The loss of time due to recruiting and training another worker
- The expense of recruiting and training another worker
- The negative impact on employee morale
- The negative impact on client solutions

Our research and experience also shows that new employees are challenged from day one. In order to be successful, new employees require focused training and meaningful work that meets their expectations. We have also seen that employers:

- Benefit from pre-trained personnel for on-boarding and team building
- And can pay a cost for making a poor hiring decision: That cost can be monetary, however it can also affect productivity, morale, or even client relations.

In our experience, there is high demand for technical talent and the high cost of turnover leads us to think about new and innovative ways to achieve new hire retention. For these reasons, we believe that a talent pipeline could be beneficial both to the employer and the on-boarding employee as it can lead to improved performance, reduced turnover and heightened engagement. It could also allow an organization to assess how well that top talent can fit into the organization over time.

There are many examples of the success of pipelining outside the business world, to include The Talent Identification Program used for young soccer players to grow in their sport. Learning from such examples could allow the Business world to build similar talent pipelines, especially in STEM fields, to position young talent for future accomplishment.

3. TEAMWORK

We have discussed the importance of identifying top talent and the importance of on-boarding personnel. However, it is not sufficient to solely identify top talent in their fields, but it is equally (if not more) important to have that talent successfully integrate into the existing workforce and become a productive team player.

We will now discuss a model we are using across our organization and our customers for identifying STEM talent, integrating them into workforce teams and helping us to assess those top candidates that could potentially be developed further into successful career professionals.

There's a lot of research and writing on the topic of building and sustaining high-performance teams. Interestingly, it's one of the most enduring themes in graphic novels as well. For example, in Marvel's "The Avengers" movie, we see several examples related to the challenge of building and sustaining a high-performance team [6].

Examples like this help to illustrate the point that bringing together superstars isn't easy, and keeping them together may be even more difficult. It is also an example of where the strength of leadership can quickly determine the outcome of a project or team. These lessons emphasize some of the challenges inherent in bringing individuals together in the pursuit of a common goal – that of becoming a valuable workforce professional.

4. APPROACH

In our organization, we have adopted an approach to meet our demands for STEM skills through a comprehensive career development program that attempts to address:

- Keeping staff from leaving early
- Providing sufficient amount of training
- Developing a pipeline
- Providing continuous career monitoring and development

We currently are focused in several STEM-related areas where demanding a need for maintaining a high performing workforce:

- Robotics and Autonomous Systems
- Cyber Security
- Mobile and Context Aware Computing
- Real-Time Predictive Analysis and "Big Data" Analytics
- Integrated Sensors
- Healthcare

To meet these needs, we have adopted an approach designed to be adaptable to meet current and future organizational needs. This approach, detailed below, emphasizes team collaboration and performance while also building upon early career outreach and development initiatives.

5. THE PIPELINE MODEL

As we have discussed previously, one of the hardest things to do in modern corporations is to keep the talent pool young and vibrant [3]. Early career hires tend to bring new and exciting ideas into play that may not even be considered by their more seasoned peers. The challenge to early career hires is the extreme difficulty in finding candidates who, not only have book knowledge, but also have hands-on, real world experience.

We have formalized a talent pipeline model that entails a process from recruitment through multi-year training, competition and experience cycles on track toward becoming a professional in the workforce. Key characteristics of this model include:

- The pipeline helps to identify talent early, and give sustained period of performance for the organization and the candidate to both assess a longer term fit for the organization.
- It requires an investment by all parties to help develop and assess technical, soft and teamwork skills.
- A performance and development process is used throughout the pipeline to assess a candidate's role, results and behaviors as it relates to the projects they support.
- Acceptable candidates that complete the pipeline, typically after completing a degree, enter the workforce as an early career professional.
- At that point, additional career development initiatives helps those professional staff to stay current in their field and/or to expand to new skill areas.

This execution of this pipeline model consists of four main phases:

- **Recruiting** – Casting a wide net to prospective high school and college students, assessing their knowledge and performance in a competition, and offering internships for top performers.
- **Training** – Providing the tools necessary to get students up to speed on relevant topics.
- **Competition** – Using what they have learned to showcase their individualized skillsets in a refereed competition.
- **Experience** – Enabling the best-of-the-best to take part in recurring on-the-job training in the form of internships.

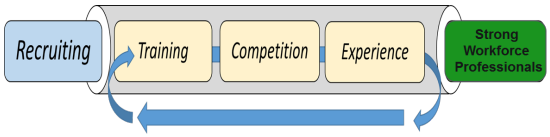

Figure 1. The Talent Pipeline

Depicted in Figure 1, the pipeline model focuses on early career candidates, often before they have graduated. It immerses them in cutting edge, real world training that prepares the students to take part in a challenge based activities. Here the student's knowledge and skills are put to the test. This process helps to expose talent to hiring managers who get the opportunity to offer internships to them [5]. Throughout this cycle, the students receive mentorship, training in the form of a tailored Learning Path and internship opportunities. We have experienced that this cycle of training, competition and internships, when repeated over the course of a four year college education, has produced some of the best early career hires to date.

However, to execute this model successfully takes a comprehensive strategy based on several key actions:

- Partnerships: By bringing together diverse stakeholders across Government, Industry and Academia, we seek to engage in collaborative discussion on common outcomes for education and professional career paths.
- STEM outreach: Active engagement with community partners and Science, Technology, Engineering, and Mathematics (STEM) educators is used to develop formalized and comprehensive educational opportunities for students of all levels/age groups.
- Work Experience and Internships: By providing jobs working "real world" problems allows students to gain hands-on experience, hopefully creating those aha moments as they study STEM courses.
- Training, Learning Paths and Certifications: Established learning paths help staff to continue to grow skills in new areas and/or to develop their current skills further in specific areas of interest.

6. EXAMPLES IN PRACTICE

To illustrate this model in practice, we now highlight three different example talent pipeline approaches we have adopted over the past four years:

- Apprenticeship program
- Internship-based projects
- Gamification-based hiring techniques

The first approach illustrates our STEM-based Apprenticeship Program. This program provides hands-on project opportunities for high school and college students to gain realistic work and research experience in a career field that is of interest to them while providing value to MITRE projects and Sponsors. The Apprentices are unpaid volunteers working under a MITRE mentor on project related tasks to gain experience and earn community service hours to fulfill scholarship needs. We have also used these projects to allow students to meet their senior class project requirements.

An example of this approach is our MITRE sponsored research program in maritime and underwater autonomous systems. This multi-year internally funded research program provided an opportunity for several of our intern students to lead and mentor a team of local high school students associated with a robotics program for the purpose of conducting research for one of our government customers that:

- Rapidly prototyped a Unmanned Underwater System (UUS)
- Integrated a floating communications module with GPS to provide location-based services
- Provided an automated capability for collecting water samples

The overall approach proved to be effective for low-cost research, innovation and rapid prototyping as well as being a good source for future talent development.

The second approach we highlight pertains to Government and Industry STEM Internship projects. This approach highlights more complex and diverse projects where MITRE works closely with our government and industry partners to identify problems/challenges our customers need addressed, and work to create paid projects that pair interns with MITRE staff to work and deliver to meet the project requirements.

In this integrated team approach:

- The government customers define problems and identify funds for the initiatives
- MITRE performs the role of lead systems engineer and conducts the hiring and mentoring of interns to support the initiatives
- Industry provides consultants, engineers, mentors and resources
- Student Teams design solutions and develop prototypes

An example of this approach is the Tactical Light Operator Suit (TALOS) project that we highlighted during last years conference. If you recall from last year, we highlighted the SOCOM project to work with Industry to develop a "Iron Man" suit to protect solders.
As part of that overall project, MITRE worked with SOCOM and Industry to establish a STEM outreach initiative to assess what high school robotics teams might contribute to the innovation. In this specific project, four MITRE interns provided the engineering mentorship of seven high school teams over the course of ten weeks to research, develop and transition knowledge and technology to the government. This project offered an excellent hands-on learning experience for all involved.

Our third approach highlights our use of gamification techniques to support a competition-based interview process. Integrated into our Human Resources processes, this approach entails the use of competitions, games, practice ranges and exercises to assess student performance and help identify top candidates for the pipeline and as part of a hiring process. They also provide an excellent vehicle for gaining continuous hands-on practice in key skills. The key components associated with this approach include:

- An online system for hosting gamified interviews
- Quantifiable metrics and processes implemented within the organization's Student Internship Program
- Participants submitting resumes to the human resources (HR) system
- Student performance measured throughout the game and used as part of the evaluation process

An example of this approach is our Cybersecurity Capture the Flag (CTF) Challenge competition [4]. The CTF is an opportunity for college and high school students to learn, practice and compete with their peers in cyber security. As an example, our 2014 competition entailed 24 hours of competition with 66 teams (264+ students) engaged in distributed fashion attempting to solve challenges in software binary exploitation, computer forensics, cryptography, web and mobile security. The top students were offered the opportunity for scholarships, internships and potential future jobs.

7. CONCLUSION

Overall, the results over the past several years since we adopted the model and strategies discussed are promising. For example, in 2014 we had an estimated 166 interns working at MITRE on various projects. Many of these students are involved in our pipeline and return to MITRE yearly.

With participation in our high school and college programs continuing to grow, over the past four years we have averaged 61% of interns continuing on to careers within our organization. About 36% of our interns go on to pursue STEM internships outside of our organization, and approximately 4% of them have moved on to non-STEM careers in industry. In all, our pipeline model has yielded a 97% job placement outcome over that four-year span. These successful results highlight the potential value of the model.

In conclusion, we have attempted to highlight approaches for building corporate talent pipelines to help develop and grow workforce teams.

The bottom line is that by working together we have the ability to build stronger professionals in the workforce:

- Educators can shape curricula around a common language and the latest advances.
- Students will graduate with knowledge and skills that employers need as well as better prepare for a career with certifications and additional training.
- Employers will be better able to define the skills they need, which then helps students to better define the skills they need, and allows for a larger pool of more qualified candidates.
- Employees will have a better-defined career path and be better able to determine development opportunities.
- Policy makers can set standards to promote workforce professionalization.

Our data has shown that the pipeline approach can yield an impressive crop of interns and ultimately, qualified early career hires. To date, our data indicates that this process is not only successful, but is increasing in value each consecutive year.

8. REFERENCES

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