

From Craftsmanship to Connectivity: Exploring Networked Learning in a Contemporary Corporate Apprenticeship Program in the United States

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Abstract

Apprenticeship is a long-valued form of workforce learning. Historical models of craft apprentices learning a trade from a master have prevailed for centuries. In more recent eras, apprenticeship programs have proliferated in industrial sectors and are now facing a revival in corporate settings. These contemporary programs face challenges that are different from those in earlier renditions, and so it is essential to understand how learning happens in these dynamic environments. This paper analyzes interview data from five participant case studies to examine a US-based contemporary corporate apprenticeship program at a consulting firm. The program provides a full-time and fully paid learning and working experience for non-degree candidates. It operates in 40 cities across the United States and has enrolled over 2,000 apprentices. Apprentices have formal and informal learning experiences throughout the program and are part of geographically dispersed teams via a hybrid workplace that is predominantly virtual. The analysis reveals how digital tools afford apprentices many benefits, such as access to a broader networking environment, independent interest seeking, engagement in informal betterment with experienced others, and participation in shared discovery and problem-solving with peers. However, it also reveals that situated learning in a project context and strong relationships with various experienced others are equally essential. These findings paint a picture of how apprentices collaboratively engage in value-generating activities as mediated by technology and engage in networked learning.

Key Words

Apprenticeship, Situated Learning, Learning Ecologies, Workplace Learning, Cognitive Apprenticeship, Legitimate Peripheral Participation

Introduction

Over the past few years, apprenticeships and workplace-based learning programs have gained significant attention as effective means of meeting the evolving needs of the labor market across the United States (Federal Reserve Bank, 2019). This revival, supported by policymakers, educational institutions, and commercial organizations, broadens the scope of apprenticeships in the United States to include jobs that historically have required a bachelor's degree in addition to traditional craft trades (Brookings Institute, 2021). Support is largely derived from the perceived benefits of apprenticeship programs, including the provision of increased wages for workers and workforce stability for employers, as well as disproportional economic mobility benefits for traditionally marginalized groups (Gallup, 2024).

Apprenticeship is an established mode of learning that ensures the learner can associate learning with the application context (Collins & Greeno, 2010). However, contemporary corporate apprenticeship programs have features that are different from those of historical models of craft apprenticeship and continue to evolve and stretch notions of apprenticeship (Forshaw et al., 2024; Gowlland, 2014; Fuller & Unwin, 2011). For example, corporate apprenticeship programs today must enable learning outcomes in a digital context, as professional work today increasingly involves digital tools and hybrid working environments (Harteis & Billet, 2023). They involve multiple 'experienced others', not just one master craftsman. The types of skills they focus on developing are also different, as they are more cognitive in nature than they are craft. Furthermore, they typically involve a much larger learning cohort and community of apprentices than the traditional archetype of a paired master tradesman and their apprentice.

Because of these differences, a change in perspective and further research are required to fully realize the potential of these contemporary corporate apprenticeship programs in the United States (Morley Ryan et al., 2023). This study

explores a corporate apprenticeship program within a global consulting firm's United States business. It highlights the influence of digital technologies, social networks, and learning communities on informal workplace learning and corporate apprenticeships.

Conceptual Background

Studying learning within a community as mediated by technology.

Networked learning has evolved as a field of inquiry over the last twenty-five years, alongside the increasing use of technology in educational contexts. It provides an epistemic lens by which to conceive learning, which involves using technology to mediate connections between learners, concepts, and resources (Goodyear, 2004). In a recent conceptualization of networked learning, Oztok (2021) revised this definition to emphasize the role of technology as a mediator of connections that furthers the goal of cultivating knowledge within a community. For learning organizations within digital corporations, analysis through this lens helps conceptualize how apprentices cultivate knowledge through socio-developmental relationships when ‘workplaces are learning environments’ (Billett, 2004).

Conceptualizing apprenticeship learning as situated within socio-cultural contexts with others.

The fundamental principle of situated learning theory emphasizes that learning is most effective when it is embedded in specific social contexts and interactions that support the cognitive processes behind learning (Lave & Wenger, 1991; Brown et al., 1989; Saivyer & Greeno, 2009; Suchman, 1987; Hanks, 1991). This theory suggests that genuine and long-lasting learning occurs through active engagement and participation (Hanks, 1991). Within learning contexts, there are people. Learners working alongside others allow for a cognitive apprenticeship, where learners can see work processes and experience others, which can make their thinking visible (Collins, Brown, & Holum, 1991). It is through these types of processes of enculturation into a community of practice that learners are able to engage in legitimate peripheral participation (Brown & Duguid, 1991; Toulmin, 1999; Lave & Wenger, 1991; Perkins, 2008) and thereby learn how to engage in tasks and become a member of the community. Apprenticeship is an embodiment of this social practice (Guile & Young, 1998).

Understanding a learner’s multi-dimensional learning network

Learning ecologies can be conceptualized as complex systems comprising interrelated factors that facilitate learning within a specific context (Jackson, 2016). This analogy parallels ecosystem ecology, which examines the interrelationships between living organisms and their abiotic surroundings within a given environment. Studies of students’ learning ecologies frequently document various environments, including the home, school, workplace, university, after-school care programs, self-directed learning, and other relevant settings, as a means of describing the self-directed and multi-faceted experience of a learner (Barron, 2006). Learning ecologies emerged in response to the growing recognition that learning happens beyond traditional educational settings (Illich, 1970). Instead, learning takes place situated in contexts (Lave & Wenger, 1991). It is facilitated by people, skills, tools, technologies, and resources centered around the learner. For learning workers, they provide an opportunity to visualize and explore a self-directed learner’s multi-dimensional learning network as they navigate learning to work.

Current Study

1. Program Background

This study was conducted in the apprenticeship program at a global consulting firm’s United States business. The program is a year-long, full-time, and fully paid working and learning experience in which apprentices are assigned a pathway spanning application development, program and project management, data science, customer service, and human resources. The program operates in 40 cities and has included over 2,000 apprentices. Candidates come from nonprofits, community colleges, boot camps, and direct sourcing (Morley Ryan et al., 2023; Forshaw et al., 2024).

The program involves 2,000 hours of on-the-job learning and instruction. All apprentices learn skills needed in the future of work, including cooperation, communication, problem-solving, data analysis, agile work, computer literacy, and collaboration tools. Typically, each apprentice works on two to three projects during the program after having had

the opportunity to shadow someone. Working and learning are conducted via a virtual or hybrid workplace. Throughout the program, apprentices are assigned formal supervisors, people leads, and HR partners and are expected to build mentor, buddy, and team member relationships to aid in their learning. The overwhelming majority of apprentices who successfully complete the program are provided with ongoing career opportunities at the firm (Morley Ryan et al., 2023; Forshaw et al., 2024).

2. Research Questions

This study explores the positioning of a contemporary corporate apprenticeship program as networked learning. It provides an archetypal study of a contemporary corporate apprenticeship program that highlights how learning is networked between people, sites of learning and performance, ideas, and resources. It does this through two research questions:

1. What are the nodes of an apprentice’s learning ecology? And what is the nature of the interactions between the nodes within?
2. What are the socio-learning activities within the digital apprentice community? And what role does technology play in enabling them?

Methods

1. Participants and Data Collection

The data collected in this study were part of a larger research agenda on the pedagogy of contemporary apprenticeship (Morley Ryan et al., 2023; Forshaw et al., 2024). The sample included five graduates from a professional technology consulting apprenticeship program. Participants graduated from the program between 2020 and 2022. Participants were sourced via email to 30 of the program's alumni. The first five signups were selected to participate and represented a cross-section of geography, education, and occupational experiences (Table 1).

Table 1. Study participants’ region and background

#	Pseudonym	Region	Pathway to Program	Prior College	Prior Work Experience
1	Nelson	Atlantic	Workforce Development	Did not complete	Extensive
2	Hani	West	Via Recruiter	None	Moderate
3	Carlos	South	Workforce Development	Did not complete	Limited
4	Olivia	Mid-West	Technology Bootcamp	Did not complete	Moderate
5	Pia	Northeast	Via Recruiter	Community College	Limited

Source: Forshaw et al., 2024.

This study involved semi-structured interviews lasting 60 minutes with each participant. Interviews were chosen as the method of inquiry into the participant’s experiences of the apprenticeship program because they help us create portraits of human experience that center on what it means to be a person learning in our world (Mishler, 1996). Interviews were recorded and transcribed using Zoom and atlas.ti. Robert Weiss's (1994) semi-structured interview technique inspired the interview approach. As Peshkin and Glesen (1992) recommended, the first question asked participants to describe themselves personally and professionally with the aim of making them feel comfortable and grounded. Subsequent questions were broken into three phases. Firstly, general questions about their experience in the apprenticeship program at a high level. Secondly, questions were designed to get at specific experiences they had. Thirdly, hypothetical questions about what they would recommend to future apprentices. To close, participants were asked if there was anything else that they wanted the researchers to know about the program or their experience.

2. Data Analysis

The initial thematic analysis leveraged inductive and deductive coding strategies (Emerson et al., 2011; Deterding & Waters, 2021; Timmermans & Tavory, 2012). This allowed emic themes to emerge while also coding for the features of the pedagogy of contemporary apprenticeship (Morley Ryan et al., 2023). Participant data was deidentified, and

thematic memos were written for each theme, as was a case study of each participant. From this initial emic analysis, “Codable moments” (Boyatzis, 1998) relevant to networked learning also emerged and inspired a subsequent round of coding. This second round involved looking at the data with the specific lens of understanding how apprentices are socialized, how they interact with experienced others, how they engage in socio-learning activities, and how they interact within and between learning and performance environments, as well as tools, ideas, and resources. Through this second grounded analysis, learning ecologies (see Figure 1 and Figure 2) for each participant emerged and were visualized based on their language and description of learning and activities that crossed the boundaries of modes, contexts, and communities. Like in Barron’s (2006) work, the goal of these ecology diagrams is to describe but not to generalize. Documenting their ecologies allowed network learning for each individual apprentice to be visualized, thus identifying similarities and differences in the relationships between nodes across apprentices.

Findings

Research Question 1: What are the nodes of an apprentice’s learning ecology? And what is the nature of interactions between the nodes within?

There are six categories of nodes in the apprentices' learning ecologies.

Across the five apprentice stories, six categories of nodes make up their apprentice learning ecology (see Table 2). As in any ecology, these categories are not mutually exclusive but have intricate patterns of overlap and interactions.

Table 2: Apprentice Learning Ecology Categories

Category	Description	Example Nodes: Learning Activities and Spaces
Required Formal Learning	Formal learning experiences that are a required part of the apprentice program	Onboarding, Certification, Software Bootcamp
Distributed Resources	Asynchronous resources and materials that are available via the Intranet	Knowledge Base, MyLearning, Technology Quotient, Percipo
Outside Learning	Formal and informal learning that is conducted outside of the organization	Google, Bootcamp, Family, Udemy
Community	Informal learning that happens by being in and with community	Employee Resource Groups, Account Meetings, Learning Pods, Apprentice Alumni Council
Experienced Others	Formal and informal developmental relationships with experienced others in the organization.	People Lead, HR Lead, Account Lead, Team Lead, Manager, Managing Director, Buddy, Practice Lead, Mentor, Peer Team Members
Project and Work	Learning that is situated in the work and project environment, or through legitimate peripheral participation	Project Tools, Project Work, Project Team, Shadow Project Work, Client System

Apprentices frequently engage in learning that requires inter-node interactions and crosses category boundaries.

Based on the volume of nodes, apprentices in the program gravitated towards socially situated learning in and around their “work” contexts (Figure 1 and Figure 2). While outside learning opportunities, distributed resources, and required formal learning opportunities are abundant and available, apprentices mostly describe and recount learning between their work community, experienced others, projects, and work tasks, situating their learning largely with the community and in activity.

The arrows in Figures 1 and 2 highlight this flow of learning interaction and activity between the different nodes, and the arrow text details the modality in which the interaction occurs. For example, Hani (Figure 1) describes meeting with their buddy via Microsoft Teams each week and reviewing a shared Excel file with a question list. Hani also then engages in joint attention in specific project technologies with their Practice Lead, who then uses different digital tools to provide feedback to Hani. This feedback is shared with their HR Lead and then used to craft development points.

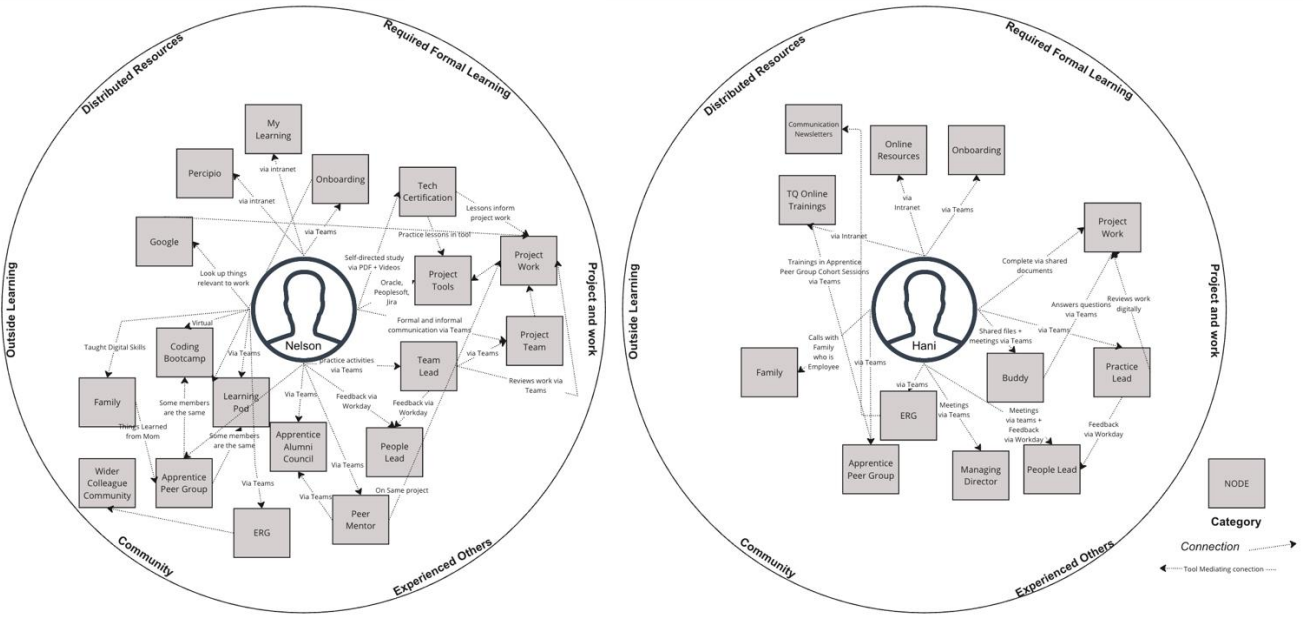


Figure 1: Learning Ecologies of the Apprentices 1 and 2

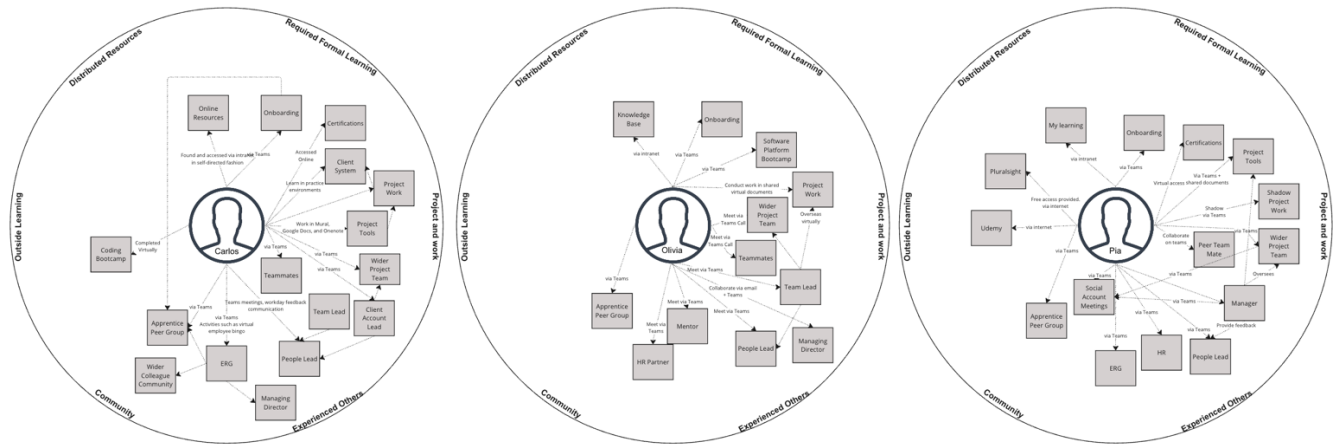


Figure 1: Learning Ecologies of Apprentices 3, 4 and 5

Another example can be seen in Nelson, Carlos, and Hani’s ecologies as they describe joining an Employee Resource Group (ERG). Their descriptions highlight that this activity and node don’t exist in a vacuum, but instead that either the process of joining or the outcome of joining drives cross-category node interaction.

Nelson: I've joined a lot of ERGs, so I'm able to meet people in different states.

Carlos: We have a lot of employee resource groups... one of the things that a lot of the employee resource groups do is network bingo...you download a digital bingo board, and your squares would

look like, for instance, meeting a managing director that you did not know before, meeting an apprentice that you did not know before, meeting somebody out of your particular practice.

Hani: It took us to a website where all our ERGs were listed. You choose one and you join in and once you join the site, then you are automatically connected to all the communications or the meetings that come through (Microsoft) Outlook.

ERGs are just one example of how one node can drive interactions with many other nodes in a learner's ecology while also looking different for each learner. No two learning ecologies are the same, nor should they be, as the apprentices are each unique individuals with different self-directed interests, ways of working, and resource preferences. However, across all five apprentices, we can see clear categorical node clusters and an abundance of networked interactions.

Research Question 2: What are the socio-learning activities within the digital apprentice community? And what role does technology play in enabling them?

Developmental relationships between apprentices and experienced others are pivotal to learning and enhanced by digital tools that allow informal and fast joint attention on a task for fast instruction.

Collaborating virtually with experienced others is vital to the digital apprentice experience. Apprentices describe how these relationships are more than just a quick call or chat but also involve joint attention as a mechanism for receiving instruction, as afforded by screen sharing and live virtual documents. Hani, Carlos, Pia, and Nelson provide examples detailing developmental relationships with joint attention:

Carlos: You have a client account lead and a project manager. We had 9am meetings at least three days of the week to understand what our assignment is, what we completed, and what needed to be done next. To keep things in line for that project, we used the mural board (digital whiteboard software). We were given instructions day by day, week by week to what needed to be done and how.

Nelson: Three of us were working on this (IT helpdesk) ticket. One of them was the manager. He took the reins, but he was teaching us how to resolve problems so that the next time, say he is busy, or he cannot help, then we would be able to figure it out on our own. We got on a (Microsoft) Teams call, and he walked us through the steps and showed us how to resolve his query. He showed us where to find queries and showed us how to add a field to our form.

Hani: We sustain this live (Microsoft) Excel file on the current questions that I have throughout the week... and... we would just get on a meeting and look at that (Microsoft) Excel file and once we come to a task, he will let me take it to where I know where to take it. Once he sees where he needs to step in, he would step in and provide clarity of the bigger picture of why we do it this way.

Pia: I had a manager and she showed me how to do things. She showed me how to write test cases, how to test cases, how to go to the platform and do a couple of things.

Often, these interactions are casual, lightly structured, or on an as-needed basis. They rely heavily on digital collaboration tools such as video conferencing, shared channels, direct-to-person chats, and sharing screens to enable that informality. For example, Hani and Nelson also describe instances where they would reach out to a peer when they needed just-in-time support and direction:

Hani: [My] buddy was more an informal kind of relationship. Whenever I would have random questions, I could always just ping (communicate via digital chat software) them.

Nelson: You just message them on (Microsoft) Teams and ask them, hey, I need some clarification on this. Would you be able to help me out? And they would all say yes, they would all help. Or direct you to someone who had a bit more knowledge on it.

Peer relationships and learning cohorts provide opportunities for shared discovery and are supercharged by flexible and collaborative digital tools.

Peer relationships facilitate essential socio-learning activities that strive towards the shared cultivation of knowledge. In the apprentice program, digital tools such as video conferencing, breakout rooms, sharing screens, and sharing digital resources are all instrumental in enabling shared learning. Nelson provides an example of this that highlights how they engaged in a socio-learning relationship with their peer mentor that was largely mediated by technology:

Nelson: My peer mentor and I were on the same project. We were just on different parts of it. We'd always share resources with each other. We'd get on phone calls and share the screen with each other so that we could see what one another was doing.

Carlos and Hani also provide examples of digital collaboration tools enabling peer learning during a learning cohort:

Carlos: We did a lot of group meetings, learning how to operate (Microsoft) Teams...how to just be virtually inclined, learning how to work as a team...They would put us in different breakout rooms, different teams to solve different issues and problems.

Hani: I remember joining the onboarding team. We were split into different groups... they put us into different break rooms where we would learn how to collaborate with different type of working styles...leadership styles.

Hani's description of their experience is particularly interesting, given it discusses not only using digital tools to collaborate with peers and learning cohorts but also intentionally learning how to collaborate with different working styles between them.

Distributed digital resources are perceived as a way of independently skilling, although even then, their existence is rooted in a socio context.

While apprentices rely heavily on socio-developmental relationships for learning, many were empowered to leverage internally and externally distributed digital resources and tools to help them supercharge their learning.

Pia describes how members of their community recommended a distributed digital resource that could be helpful for their careers:

Pia: I was told ServiceNow (a workflow software tool) is really nice. I started going that road. I got my certificate on ServiceNow and planning to get my developer certification soon.

Nelson, Hani and Olivia describe how distributed digital resources can be used independently learn.

Nelson: I feel like Google is the first thing before you go to someone else.

Olivia: I like that we can always tap into different types of learnings to increase our knowledge in these different platforms and software... Let me learn this and get the things that you need and go tap into the knowledge base.

Hani: Basically, you learn about all the different type of technologies that we work with, and so I was really appreciative of that because in some of my discussions with some of my analysts now, I'm able to understand the different type of skills.

Hani's description here is most interesting, as it highlights how, through that independent learning experience about the different technologies the firm works with, they are able to better understand what it is that their team members and peers do and, thus, have better discussions about the work with them.

Discussion and Conclusion

This study is an account of an apprenticeship program at a multinational consulting firm. It is not intended as an evaluation of the program or a generalizable recommendation— and it does not capture the data necessary to be either. Instead, it is a consideration of how it works through the epistemic lens of networked learning. It set out to provide an archetypal study of a contemporary corporate apprenticeship program that highlights how learning is networked between people, sites of learning and performance, ideas, and resources and to describe the learning ecologies of the apprentices as a window into their experience.

Insights revealed that these entirely virtual apprentices typically had a learning ecology made up of six categories of nodes (Table 2) that had high levels of interactions between them. Rarely did a node exist without connecting to another node or being mediated by technology. Digital tools appeared to afford ease of interactions between the nodes while also providing the apprentice opportunities to access a broader networking environment, level up independently, engage in informal betterment with experienced others, and participate in shared discovery and problem-solving with peers. Together, these findings highlight the role that digital tools can play in accelerating the development of nodes within an apprentice Learning Ecology. However, they also indicate that digital tools might facilitate networks between the nodes and mediate connections (Goodyear, 2004). Said more plainly, it suggests that an apprentice's ability to leverage learning from one node and apply it in another or to amplify learning from one node and build upon it in another is, in part, afforded by the digital tools they use. Such findings are in line with Oztok's (2021) more recent conceptualization of networked learning that emphasizes the role of technology as a mediator of connections that furthers the goal of cultivating knowledge within a community.

The role of digital tools in node enablement was not the only emergent finding. Emic themes also revealed that situating learning in or alongside a project context and strong relationships with various experienced others were key parts of these apprentices' experiences; indeed, the majority of each apprentice's nodes and interactions were in the community, experienced others, and project and work categories of their learning ecologies. Interestingly, the moments of learning between an apprentice and an experienced other that were described as most impactful were often informal but proximate to the work and project environment. This insight isn't terribly surprising given the depth of literature highlighting the importance of legitimate peripheral participation and enculturation into the community of work through proximity to it (Brown & Duguid, 1991; Toulmin, 1999; Lave & Wenger, 1991), as well as the nature of apprenticeship (Collins et al. 1991; Collins & Greeno, 2010; Guile & Young, 1998). However, since so much of this research happened prior to the proliferation of digital and remote learning at work, let alone virtual apprenticeship, it is affirming to see it applied in entirely virtual and digital communities and through experienced other and apprentice relationships.

Gaining descriptive insights that inform our understanding of how a contemporary corporate apprenticeship program works is essential to inform our guidance of them further as they proliferate. Since many operate outside of traditional workforce development purview or regulatory bodies in the United States, they must remain a focus of inquiry so that they are considered learning experiences first and talent pipeline programs second. We must continue to understand their archetypal practices and the experiences of participants to build a scientific understanding of what works. Hopefully, by doing so, contemporary corporate apprentice programs can support the education and economic mobility of many people globally and continue to support a pathway to good jobs.

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