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Journal

European Journal of Training and Development

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Publication Date

2026-08-25

Peer reviewed

A case study on the work and learning of work-from-home employees in Silicon Valley: lessons from the pandemic

European Journal
of Training and
Development

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Received 15 July 2025

Revised 1 October 2025

9 June 2026

Accepted 16 July 2026

Abstract

Purpose – This study aims to analyze the work and learning experiences of ten work-from-home (WFH) employees in Silicon Valley during the COVID-19 pandemic. Using qualitative case study methods, this study examines employees' work and learning experiences during telecommuting and offers insights for post-pandemic flexible workplace.

Design/methodology/approach – In-depth interviews with ten telecommuters were analyzed using thematic analysis procedures, providing seven main themes. Ecological systems theory served as the theoretical framework to interpret findings across multiple layers.

Findings – The findings of this study reveal how the shift to WFH simultaneously disrupted multiple ecological layers. At the microsystem level, online meetings became the primary form of daily work, while digital tools replaced informal interactions. At the mesosystem level, eroding connections weakened collaboration, turned colleague networks instrumental and left newcomers without social scaffolding. At the exosystem level, company-initiated social programs failed to compensate for the loss of organic interaction. At the macrosystem level, Silicon Valley's performance-driven norms shaped how employees interpreted autonomy and accountability, producing divergent outcomes. These disruptions illustrate how WFH fundamentally restructured the ecological systems in which employees work and learn during the pandemic.

Research limitations/implications – Findings are based on a small, context-specific sample and may not generalize broadly. Future research should use larger-scale, comparative and quantitative designs to extend understanding of remote work learning dynamics.

Practical implications – Organizations should design inclusive virtual environments, invest in hybrid work strategies and support self-directed learning and newcomer socialization to sustain engagement and performance in remote settings.

Originality/value – By empirically mapping WFH experiences onto ecological layers, this study extends ecological systems theory to remote work contexts and offers a multilevel framework for how environmental disruptions simultaneously reshape work, learning and relationships.

Keywords Work-from-home, Remote work, Workplace learning, COVID-19 pandemic, Ecological systems theory, Silicon Valley

Paper type Research paper



European Journal of Training and
Development
© Emerald Publishing Limited
2046-9012
DOI 10.1108/EJTD-07-2025-0142

Introduction

As a result of the COVID-19 pandemic (hereafter, the pandemic), many companies, schools and organizations began implementing work-from-home (hereafter, WFH) policies. During the pandemic, more than half of US employees shifted to WFH (Owl Labs, 2020). By 2025, 28% of full-time employees work fully remote, while 51% have adopted hybrid models, a seismic shift from the 17% who telecommuted before the pandemic (Altig et al., 2020; Gallup, 2025). Remote and hybrid workers now show higher engagement and well-being than onsite-only workers, and projections suggest 37% of US jobs may permanently shift to telecommuting (Dingel and Neiman, 2020), signaling that WFH has become a “new normal.”

Remote and hybrid work have become institutionalized features of today’s labor market, no longer temporary pandemic measures (Shockley et al., 2024; Lauring and Jonasson, 2025), and the pandemic served as a large-scale experiment whose lessons remain relevant for collaboration, knowledge transfer and well-being in digital work (McPhail et al., 2023; Ropponen, 2025). Yet in-depth empirical inquiry into how employees experience work and learning while telecommuting remains limited, and existing workplace learning theories – largely grounded in physical environments – leave a conceptual gap for virtual and hybrid contexts.

Therefore, this case study examined WFH employees’ work and learning experiences through ecological systems theory, drawing on the voices of Silicon Valley tech companies’ employees, a context where fully remote workers accounted for 42.4% in 2020 and 32.6% in 2024, above national averages (Silicon Valley Institute, 2026). The following research questions guided this study:

- RQ1. First, what changes did the Silicon Valley tech companies’ work-from-home employees experience in their telecommuting work environments during the pandemic?
- RQ2. Second, how have the Silicon Valley tech companies’ work-from-home employees worked and learned during the pandemic?

This study examines these changes through ecological systems theory. By examining the WFH experiences of Silicon Valley tech companies’ WFH employees during this critical period, this study suggests practical and theoretical directions for workplace learning and human resource development (HRD) fields to move forward amid the changing paradigm of the workplace.

Literature review

Changes in workplace because of the pandemic

The pandemic brought about lasting changes in working life, with telecommuting becoming a lasting new normal accelerated by digital platforms and artificial intelligence (AI) (Buheji, 2020; Kaushik and Guleria, 2020). Telecommuting brings notable benefits for employees, including increased work autonomy, improved work-life balance and greater flexibility in managing personal and professional responsibilities (Diab-Bahman and Al-Enzi, 2020; Kaushik and Guleria, 2020). Virtual connectivity also enables employees to interact with reduced emotional burdens, which is expected to enhance well-being and productivity (Kniffin et al., 2021; Hernandez, 2020).

On the other hand, there are limitations to telecommuting. Social isolation, reduced communication and inequalities in productivity remain key concerns, with social disconnection negatively affecting employees’ mental health and well-being (Diab-Bahman and Al-Enzi, 2020; Kniffin et al., 2021; Moretti et al., 2020). These challenges have persisted into the post-pandemic period; Shockley et al. (2024) found that remote workers still report

significant social isolation, and [McPhail et al. \(2023\)](#) highlighted the long-term organizational and sustainability implications of hybrid work. As telecommuting becomes an enduring feature of the workplace, HRD initiatives must address both the opportunities and structural challenges it presents for employee learning and development.

Current discussions of human resource development and workplace learning in and beyond the pandemic

Scholars have called on HRD practitioners to equip employees with adaptive skills for rapidly changing work contexts ([Buheji, 2020](#); [Li et al., 2020](#)). In particular, recent workplace learning research takes relational and situated perspectives, with growing interest in informal learning ([Fenwick, 2008](#)): employees learn predominantly through experience and work routines rather than formal training ([Billett, 2001](#); [Marsick and Volpe, 1999](#)), and these informal behaviors are shaped by social and contextual factors such as norms, values and organizational culture ([Leslie et al., 1998](#)). [Watkins and Marsick \(2021\)](#) accordingly stress that learning informally in remote settings demands greater proactivity, reflection, creativity and playfulness. Most recent scholarship extends this discussion to hybrid work contexts; [Lauring and Jonasson \(2025\)](#) argue that hybrid arrangements require organizations to fundamentally rethink how learning, collaboration and career development occur, while [Ropponen \(2025\)](#) cautions that significant knowledge gaps remain regarding the long-term impacts of remote work on employee well-being and professional growth.

The shift to remote work challenged the social and informal dimensions of workplace learning, with relational factors such as trust and social isolation emerging as key mediators of adaptation ([van Zoonen et al., 2021](#); [Hult and Byström, 2021](#)). Despite calls for intentional learning interventions, much remains unknown about informal learning in digital workplaces ([Watkins and Marsick, 2021](#)).

As the pandemic's forced remote work gave way to voluntary, negotiated hybrid arrangements, a more differentiated body of post-pandemic evidence has begun to address this gap, complicating the early dichotomous framing of remote work as either a threat to or a boon for workplace learning. A recurring finding is that the relationship between remote work intensity and learning-related outcomes is neither linear nor uniform. [Puhakka et al. \(2025\)](#) found remote work intensity largely unrelated to informal workplace learning and work engagement, except for a negative association with relatedness satisfaction. [Rudolph and Zacher \(2025\)](#) reported curvilinear, inverted-U relations with performance and job satisfaction, showing that the most beneficial amount of remote work is individualized rather than universal and is buffered by resources such as prior experience, appropriate technology and a dedicated workspace. The pertinent question has, thus, shifted from whether remote work helps or harms learning to under what conditions, for whom and through which mechanisms. Where remote work proves consistently consequential is in the relational dimensions of learning, most acutely for newcomers: [Mazzei et al. \(2023\)](#) found that social isolation undermined new hires' affective commitment, fully mediated by newcomer adjustment, while [Park et al. \(2025\)](#) argued conceptually that remote new hires lose the social cues through which role clarity and task mastery are acquired. A broader lesson follows: where co-located work let much learning occur incidentally, the digital workplace requires that the conditions for learning be intentionally engineered – through individual resources, redesigned onboarding or structured socialization support. Workplace learning has not been uniformly degraded so much as redistributed and made more contingent, such that sustaining it now demands deliberate HRD intervention rather than the affordances of shared physical space.

Yet this evidence has its own limitations. It rests largely on survey-based, variable-centered designs in single sectors and national contexts that treat the remote environment as a single, undifferentiated condition, rather than examining how the multiple systems surrounding a remote worker – from the home and virtual workplace to organizational policies and societal attitudes – interact across levels to shape learning. What is missing is fine-grained, context-sensitive qualitative inquiry into how remote workers experience and navigate these interconnected systems over time – the gap this study addresses through an ecological systems analysis of Silicon Valley remote workers.

Theoretical framework

Understanding work-from-home experiences through ecological systems theory

Bronfenbrenner's ecological systems theory (Bronfenbrenner, 1979, 1994) offers a framework for understanding human development through the dynamic interplay between individuals and their multilayered environments. The theory proposes five nested systems—microsystem, mesosystem, exosystem, macrosystem and chronosystem—ranging from an individual's immediate context to broader sociocultural and historical influences, with human development understood as a process of ongoing interaction across these levels.

Applied to organizational contexts, the theory offers a holistic framework for how multilevel environments shape employees' cognition, work and learning (Pawluk De-Toledo et al., 2024; Yang and Sanborn, 2021). The chronosystem is particularly relevant, capturing how individuals are shaped by environmental change over time, most notably the pandemic, which triggered simultaneous shifts across all ecological layers.

Within telecommuting, Navarro and Tudge (2023) extend the microsystem to virtual environments, defining the virtual microsystem as “a pattern of activities, social roles, and interpersonal relations experienced by the developing person on a given digital platform [...] that invite, permit, or inhibit engagement in proximal processes” (p. 19341).

Teng-Calleja et al. (2024) distinguish microsystem, mesosystem and exosystem at the levels of employee experience, team and organization in their study of hybrid workers. They find that at the organizational level (exosystem), supportive policies such as financial assistance, training and engagement activities foster positive experiences, while at the team level (mesosystem), technology-based tools and employee-care practices improve productivity and outcomes. Although their study identifies multilevel factors shaping employee experiences, how these factors interrelate across levels remains underexplored and warrants further research.

Under WFH circumstances, the ecological systems framework extends to encompass the home environment, virtual workplaces, organizational policies and broader societal attitudes toward remote work. Through this multilevel lens, this study examines how remote work experiences are shaped by the interplay between individual-level factors and contextual influences across ecological layers, a perspective that moves beyond existing workplace learning theories, which have largely been anchored in physical work environments.

Method

Data collection and analysis

This study is a case study of ten employees who work from home for Silicon Valley tech companies during the pandemic, exploring how their work and learning changed in tech companies. Therefore, the researchers used a qualitative case study approach which is appropriate to discover and identify the characteristics of essential and meaningful factors in a case within a defined boundary (Creswell and Poth, 2016). Ten participants were selected through purposeful sampling (Patton, 2002). The employees currently working in Silicon

Valley tech companies who have been consistently working from home since the pandemic at the time of the interview. Participants represented diverse roles and organizational positions, including individual contributors and senior managers across engineering and non-engineering functions, to capture variation in collaboration structures, autonomy levels and learning demands.

Of the ten research participants, six were male and four were female. Semi-structured interviews were conducted between July and November 2021, lasting 50–90 min each. Data were collected via recording and field notes, which were transcribed and analyzed in NVivo 12.0. Member checking and intercoder reliability procedures were used to enhance trustworthiness. Guided by ecological systems theory, the interview questions explored employees' experiences across ecological layers from immediate daily routines and social interactions to interactions across teams and organizational structures and broader social and cultural influences on learning and work. By mapping emerging themes onto ecological layers, the analysis moves beyond descriptive accounts of changed routines to examine which systemic levels most significantly mediated employees' WFH adaptation and how interactions across layers produced distinct changes in learning and working.

Thematic analysis (Braun and Clarke, 2006) was conducted with ecological systems theory guiding the coding processes, allowing themes to be identified at both individual and systemic levels. Following the first phase of familiarizing the data by repetitive reading and self-transcription, data were first generated as initial codes that identified meaningful aspects of this newer working context phenomenon. Then, the related codes were combined into potential themes and organized into thematic groups. After refining and reviewing the themes in relation to the research questions, final themes and subthemes were established and interpreted to represent the meaning of the cases. To establish intercoder reliability, two researchers reviewed a subset of codes after the first researcher created codes.

Research participants

The research participants were employees who work in tech companies in Silicon Valley, working from home since the March 2020 US lockdown. All had only intermittent telecommuting experience beforehand, making the pandemic their first extended period of WFH. Table 1 summarizes their profiles; names were coded to protect anonymity.

Participants held diverse roles (six engineers and one each in business strategy, project management, design and UX research) with 2–22 years of experience; variation is theoretically significant under ecological systems theory, as microsystem and mesosystem experiences differ by organizational position. Three participants (D, F, I) changed jobs

Table 1. The profile of research participants

Participants	Gender	Roles and positions	Work experience
A	M	Research engineer	6 years
B	M	Business strategy and operation senior manager	11 years
C	M	Hardware engineer senior manager	22 years
D	F	Strategy planning project manager	10 years
E	M	Software engineer	6 years
F	M	Software engineer	11 years
G	M	UI/UX design manager	13 years
H	F	Hardware engineer	2 years
I	F	UX researcher	6 years
J	F	Software engineer	9 years

during the WFH period and were interviewed for post-transition, offering valuable insight into fully remote onboarding and socialization, an underexplored dimension of WFH adaptation distinct from prior voluntary telecommuting.

Findings

The data analysis identified several major themes and subthemes, which are summarized in Table 2. These findings are also organized according to the ecological framework levels.

The findings reveal how the shift to WFH simultaneously disrupted multiple ecological layers. The following sections provide more detailed accounts of each theme.

Microsystem level

At the microsystem level, the shift to WFH fundamentally reshaped employees’ immediate work environments, transforming daily routines, communication patterns and tool usage as the virtual workspace replaced the physical office as the primary context for work and interaction.

Theme 1: Online meetings as daily routine. Online meetings became the primary form of daily work, and participants reported a sharp increase in meeting frequency. As the norm shifted, teams restructured formats to maintain efficiency:

Table 2. The research findings

Ecological layer	Themes	Subthemes
Microsystem	Online meetings as daily routine	1. Main form of work: online meetings 2. Coordinating formats of online meetings for meeting efficiency 3. Forming a horizontal relationship in a meeting 4. Alienation of people who did not attend meetings 5. The limitations of online meetings
	Increasing work interactions with tools	1. Increasing use of messenger 2. Communication through documents
Mesosystem	Difficulty working together	1. Limitations of online tools for collaboration
	Transition to work-oriented relationships	1. Difficulty in building up personal relationships 2. Developing practical and instrumental relationships
	Challenges for newcomers	1. Difficulty in learning new tasks 2. Evaluation is first, organizational adaptation is next
Exosystem	Reduced participation in company-sponsored social activities	1.Passive participation in social activities despite the companies’ active support 2. Challenging online social environments 3. Missing socialization because of reduced social activities 4. Feeling comfortable from reduced social activities
Macrosystem	Performance under the pressure of tech culture norms	1. Self-motivation as a cultural expectation 2. Loss of implicit social controls of the physical office

There are so many online meetings than in the previous working environment. We just meet frequently and frequently talk through the online whiteboard. (C).

Teams reduced sizes of the online meetings to improve efficiency as well:

The size of the meeting gets smaller because the audio shouldn't overlap. We listen to what other people say and understand more. So the [meeting] size is getting smaller. (E).

E's observation suggests that teams proactively adjusted meeting formats and sizes to compensate for the communicative limitations inherent in virtual environments. Beyond logistics, online meetings also reshaped interpersonal dynamics. Equal screen representation fostered more horizontal relationships:

I think the relationships have become much more horizontal [...] There were certain people who talked during meetings because we're connected to a position. [...] Now when you're on the screen, your face is exactly a fourth of the screen [in a meeting of four] [...] the reactions are the same [among everyone], so the atmosphere itself is more horizontal. (D).

However, virtual meetings are invitation-only, leaving non-invited colleagues uninformed and disconnected:

When I was at the office, I could see who had a meeting, and I could go back and forth around the office to catch up. [For some meetings], if there's something [of interest to me], I can say, "I want to join the meeting." But now you send a request for a virtual meeting, and only the invited person knows [about the meeting]. I don't know how the meeting is going, and I have no context, so I can feel left out a lot. (B).

His experience highlights how the invisibility of virtual meetings creates informational gaps that can exacerbate feelings of exclusion among non-invited peers.

Despite efforts to adapt, online meetings fell short of face-to-face interaction, with participants citing the absence of nonverbal cues and spontaneous small talk:

You can see gestures and facial expressions offline [...] You can feel intimacy quickly with each other, eat together, and have a small talk when sitting next to you. However, you have to turn on the meeting and officially go into the channel if you want to talk. It's so official! Online meetings are very official. (G).

Since we're all online, we can't talk briefly before and after the meeting [...] so I don't think it's easy to communicate with each other. Anyway, I have to send an official email or talk through text, and small talk is lacking. It makes some disconnections and it could interfere with my work. (H).

Yet some participants actively compensated for these limitations:

In some ways, I tend to concentrate more on online meetings because I put it [a headset] in my ear. And there was no way to catch up with what others were saying if I missed it [in online meetings], so I need to focus on the meetings more. When I was at the office, I was able to ask "What was that?" but now I can't. I think I am able to concentrate on more important things during online meetings. (C).

This variation suggests that personal adaptive strategies shaped microsystem-level experiences, with individual attitudes toward limitations producing markedly different outcomes.

Theme 2: Increasing work interactions with tools. Beyond meetings, digital tools increasingly mediated daily interaction. Messenger tools became a primary channel for immediate communication under WFH:

When I want to get back to others faster, I use a messenger like Slack, and if it's not urgent, I organize [my information] and send them an email. (A).

A's comment suggests that messenger became a primary channel for immediate workplace communication under WFH.

Document-based communication also expanded, with shared documents replacing many spontaneous exchanges:

We communicate a lot through documents. I share a lot of Google Docs and communicate with others [through them]. If I leave comments right away, the notification will go to other people, and [I can] get replies from them. (A).

For Engineers E and J, documents became a primary vehicle for knowledge transfer:

Recently, we need to concentrate more on documents [...] While I didn't read it in detail before, I do now. If I don't read it anymore, no one will help me, so it's a lonely fight [...] I think I have become more dependent on documents as my resources [...]. It's actually good to learn something from a colleague, but it's more complicated these days. (E).

E's reflection reveals how reduced access to colleagues pushed employees toward documents as a primary resource for knowledge, replacing informal peer learning. This shift illustrates how microsystem-level changes in physical proximity fundamentally altered not just how employees communicated, but how they learned and acquired knowledge in their daily work.

Mesosystem level

At the mesosystem level, the transition to WFH disrupted the relational connections that link individuals across teams and organizational structures, weakening informal collaboration, eroding personal relationships and leaving newcomers without the social scaffolding typically available in physical workplaces.

Theme 1: Difficulty working together. Although online tools were introduced to support collaborative work, participants consistently found them inadequate substitutes for real-time, in-person interaction:

There are some things I can do alone, and there are some things I can only do through collaboration. For strategy planning, I have to do it [the planning] with teamwork. Four of us [used to] always get together. [Then things] changed a bit. At first, I found the tools to work hard and collaborate with all four. There are Sticky Note tools [...] [and] there are a lot of [other] tools that allow us to collaborate in online situations. We shared them [the tools] and used Sticky Note tools, but it's definitely not [ideal] for online collaboration [...] [Overall], we're less motivated and less responsible for collaboration. [...] Obviously, collaboration is difficult. (D).

D's comment reveals that online collaboration tools could not replicate the shared accountability of in-person teamwork, leading to reduced motivation and collaboration.

Theme 2: Transition to work-oriented relationships. Alongside collaboration difficulties, workplace relationships grew more superficial. C, F and H captured different dimensions of this shift:

[Before] at least we ate lunch together, so we could do social [activities] during lunchtime. We could talk a lot on campus and when we had time, we had a lot of different ways to interact. But now we only talk online, so we're just working together. We don't have any personal relationships. We used to joke around, have teatime, and eat lunch together. There's nothing else to talk about this than work now. (C).

Aside from the efficiency of work, I think the key is how to build personal relationships with people first. If that's solved, it would be easier for me to reach out and randomly ask questions about matters I don't know. That is the most difficult and the most critical issue. (F).

When you work from home, you only have to talk about complaints through online meetings, so it's a little more official and less casual. When we talk about things like that, if we work next to each other, we can casually complain about things like "I'm having a hard time" or "I'm having a hard time because I have a kid." (H).

These accounts illustrate how WFH stripped away the spontaneous interactions that naturally build personal relationships in physical workplaces, leaving work-related communication as the primary form of peer interaction.

Some participants responded by actively constructing more selective, work-driven networks. D described this shift:

What I can do more like a trick with people is that I can target to build a network with people who are important to me, because it's online. It's comfortable and somewhat cunning behavior, but I think the relationships have changed practically. Unnecessary relationships are gone, and it's only possible to meet people in private or talk to people who need to talk with me. I think it's becoming the network I need. (D).

D's reflection reveals how the virtual work environment enabled more deliberate, selective relationship-building, transforming colleague networks from naturally formed social bonds into strategically constructed, work-driven connections.

Theme 3: Challenges for newcomers. The erosion of informal relationships was especially acute for newcomers, who faced compounded challenges of task learning, relationship-building and organizational adaptation simultaneously:

If I go to work on-site and everyone is at the office, there are simple tips that I could have learned in a week or two, but I can't quickly learn them [now], like how to use simple IT tools or even how to reserve a meeting room. It takes so long to learn those kinds of simple tasks [...] so even a year later, I think that I am asking what a new employee had to ask. (D).

F, who also changed jobs during the pandemic, described how the absence of personal relationships affected collaboration and performance:

But in this company, I started working remotely from the beginning, so I don't think there was a chance to build such a personal relationship. As a result, even when I have meetings, I only simply ask how the weather is there. I think there is an ambiguous part to asking such a deep question when the relationship is not formed. As I do that, I think I don't try to build personal relationships often and become shy away. In my case, I think it [personal relationship] affects the working performance a lot. In fact, when we have personal relationships, we have trust in each other, and I think I can create opportunities for my colleagues to collaborate with each other. (F).

F's account illustrates how starting a job entirely remotely created a self-reinforcing cycle of relational distance, progressively undermining both connection and performance.

Moreover, newcomers were evaluated on performance before meaningful relationships could form:

Because no one welcomes newcomers friendly [in virtual workplaces], if we go to the office, we can introduce someone who can support them like "Please help him [newcomer]." But [now] that's not the case, so I think it has been challenging. I don't know anyone else, I'm new to everything, but I'm only evaluated before I can get to know others. There's no environment that can support you with working, administrative, or operational tasks. (D).

D's account highlights how the absence of informal onboarding in virtual workplaces forced newcomers to navigate task demands and organizational adaptation simultaneously, before any meaningful relationships could form.

Exosystem level

At the exosystem level, organizational structures and company-initiated support programs shaped employees' social experiences under WFH, though their effectiveness varied considerably across individuals.

Theme 1: Reduced participation in company-sponsored social activities. Companies structured virtual social programs, such as monthly happy hours and randomized coffee breaks, yet participation remained passive. B and A commented:

On a team basis, we have a happy hour once a month on Thursdays at 4 p.m. If you want to drink beer, you can do that. But I don't go often. (B).

Since I was working from home, the company provides a lot of remote social events. I didn't participate a lot, but there are social events every week. I think the company does many things like matching one-on-one coffee breaks so that newcomers can get used to things and be socially engaged. But I didn't participate often. (A).

These accounts suggest company-initiated programs alone were insufficient to replicate organic socialization.

E noted that online social activities felt indistinguishable from work meetings:

I think people find social activities to be less important than before. In the past, since social activities used to [involve] going somewhere, people could forget their thoughts about working and enjoy socializing, but now [...] people tend to leave after an hour and participate in [online social activities] like a meeting now [...] In fact, 10 minutes and 15 minutes are very interactive when you meet people [in person], but when you meet them online, the interaction is not as good as you think because the interactions are usually one-sided. (E).

E's observation suggests that the blurring of work and social boundaries in virtual environments diminished the restorative quality of social activities, reducing them to yet another structured online interaction rather than a genuine escape from work.

Many participants reported feelings of isolation:

I definitely feel isolated. Of course, as a foreigner, I don't like to talk a lot with others, but now it turns into zero [interactions]. So, I want to do it a little bit. If I [were to] work in the hybrid format like going to the office twice a week, it would be good for me [...] Since there's less interaction with people and I am only staying at home [...] I have a bit of a craving [to socialize]. (B).

J even met her colleagues outside the office during the pandemic because she missed social interactions with others so much:

That [socialization] is the most regrettable thing, so I met my colleagues outside the company once. It's funny, but my colleagues changed jobs. I met them twice. When I had to go to the office, I asked people to come and meet. That's the saddest thing. I want to go to the company a little bit at least once a month. (J).

Several participants noted that reduced social activity also affected work effectiveness, with A highlighting how informal interactions had enabled spontaneous help and idea-sharing:

We used to have lunch together in the past, so it's hard to eat alone. [Having lunch together] was a bit burdensome at first. But as time went by, we became more comfortable. [...] Since I am in the field of research, we have a lot of brainstorming and ideas meetings. Previously, we used to meet

in the kitchen and talk more about ideas or things like that. It used to be helpful, but I don't have a chance [for these conversations] while working from home. (A).

B further noted that without deliberate effort to connect beyond scheduled meetings, relationships atrophy:

We used to talk about something casually in the past, and it could become an idea. And we had such lively talk, [saying] "Let's have a meeting about it!" But we don't have that now [...] Obviously, my role is to improve performance by interacting with others. I can make anything, drive something, and create products with others [...] My manager says it a lot. "In fact, even if there's nothing special, you have to talk to people and connect 1:1 so that more ideas come out." (B).

B's account captures how the loss of spontaneous, informal interaction under WFH not only reduced social connection but also diminished the creative and collaborative exchanges that drive innovation and performance.

Some found reduced social obligations a welcome relief:

What's so good about working from home is that there's no unnecessary interaction. If I can do my work well, I don't need to care about others who are experiencing difficulties at work, and I can just pretend I don't know what is going on. "I'm doing this, so if you don't ask me directly, I don't have to morally help you or do anything for you." Actually, that's comfortable. (D).

D's reflection reveals that reduced social obligations were experienced as relief by some employees, underscoring that the impact of diminished socialization is not uniformly negative and that exosystem-level organizational responses must account for diverse individual needs.

Macrosystem level

At the macrosystem level, the cultural norms and performance expectations of Silicon Valley's tech industry shaped how employees experienced and responded to the autonomy and accountability demands of WFH, producing markedly different outcomes across individuals.

Theme 1: Performance under the pressure of tech culture norms. The shift to WFH removed the physical office's implicit accountability structures, with outcomes shaped by employees' alignment with Silicon Valley's self-motivation norms. For employees who had internalized output-based norms, WFH maintained or enhanced productivity:

I've been working for a year and a half as [a] work-from-home [employee], but it's actually okay. I was really worried about the efficiency of my work and the lack of productivity [...] I think the engineering team that actually works [on the] design part has been good. First of all, I don't think the efficiency or productivity of work job has been compromised [...] When it comes to working, there's a big difference in other things except for work itself. It's actually sad. It's okay to work without personal interaction. (C).

When I think about the performance, I think it is increasing what I can do. In particular, when I want to do it, I can turn it off and have time to think. So, it's much better to focus on my work [...] (J).

C and J's experiences suggest that employees who had internalized the tech industry's self-motivation norms were able to maintain or even enhance their productivity under WFH, with the removal of office distractions amplifying their capacity for focused, output-driven work.

For others, the absence of external accountability led to declining motivation:

Nobody can track me. No one can see what I am doing. I think there's something that's making me a little lazy [...] I have no passion for work, and I only work on minimal tasks that don't exhaust

me, so the commitment to work seems to be lowered. I feel like productivity is going down. [My] work performance hasn't been good. It's gotten a lot worse for me. (B).

B's experience exposes a core macrosystem-level tension. While Silicon Valley's tech culture values autonomy and self-driven performance, WFH removed the implicit social controls of the physical office that had quietly reinforced those norms, revealing that not all employees equally possess the self-regulatory capacities this cultural context assumes.

Discussion

This study examined the changes in working and learning under telecommuting during the pandemic through an ecological systems lens. A thematic analysis revealed how the shift to remote work simultaneously disrupted multiple ecological layers, organized below by layer, with the pandemic as the overarching chronosystem context that triggered these multilevel transformations. Figure 1 illustrates how the identified themes and subthemes map onto each ecological layer, providing a visual overview of the multilevel disruptions experienced by WFH employees during the pandemic.

Microsystem level

First, at the microsystem level, WFH fundamentally transformed employees' immediate work environment. Online meetings have become a primary form of daily work with teams proactively restructuring formats and sizes to maintain communication efficiency in virtual settings. Online tools have also led to changes in relationship dynamics within organizations. Regardless of the position or role, online meetings have enabled all participants to have more

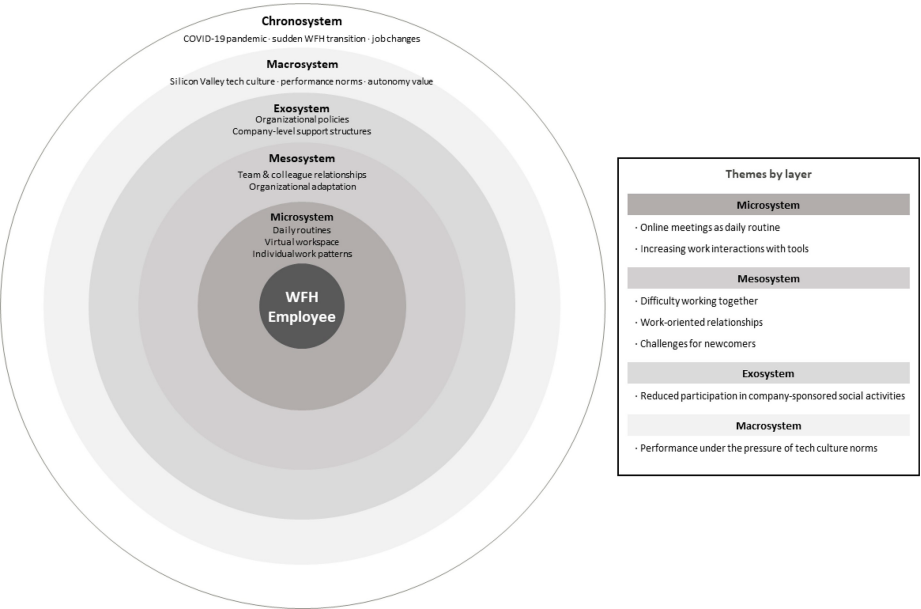


Figure 1. Multilevel disruptions in work-from-home employees' work and learning experiences mapped across ecological system layers

horizontal interactions. However, people who are excluded from specific online meetings can feel alienated from the organization when meeting information is not disclosed.

Beyond meetings, digital tools such as messengers and shared documents increasingly mediated how employees communicated and learned, gradually replacing the informal exchanges that had naturally occurred in physical office spaces. This finding resonates with [Shockley et al. \(2024\)](#), who argue that digital tools not only enable task completion but also reshape collaboration and learning processes in hybrid contexts. It highlights how microsystem level changes in tool use fundamentally altered the way employees worked and learned in their changing working environment.

Mesosystem level

At the mesosystem level, the transition to WFH disrupted the relational connections across teams and organizational structures. Active communication became difficult, producing motivation problems and a diminished sense of responsibility for collaboration – especially critical where collaboration directly drives productivity. [McPhail et al. \(2023\)](#) similarly note that reduced motivation and collaboration difficulties are long-term risks of remote and hybrid work, with implications for productivity and sustainability.

The erosion of informal interaction left employees with predominantly work-oriented communication, giving rise to what this study identifies as a “work-centered network” of deliberately constructed, instrumental connections. [Ritzer \(2005\)](#) warns that such dehumanization of organizational relationships threatens employees’ sense of identity and belonging, with long-term consequences for organizational learning and performance.

Reduced social interaction left many participants eager for connection, with some reporting negative effects on work commitment and performance. This aligns with workplace learning theory, which identifies informal social relations as the primary driver of knowledge sharing, organizational engagement and socialization, usually surpassing formally structured programs ([Lave and Wenger, 2001](#); [Leslie et al., 1998](#); [Tynjälä, 2008](#)). [Watkins and Marsick \(2021\)](#) and [Pawluk De-Toledo et al. \(2024\)](#) further confirm that eroding social ties in remote environments diminishes the incidental and informal learning that sustains organizational performance.

In addition, these mesosystem level disruptions were particularly acute for newcomers who joined organizations entirely within remote environments. According to the perspectives of existing workplace learning ([Lave and Wenger, 2001](#)), social interaction through the participation and building of relationships has been treated as necessary mediation for organizational socialization and learning of newcomers. Through legitimate and peripheral participation ([Lave and Wenger, 2001](#)), newcomers could interact with existing members, feel a sense of belonging and construct their identity as a member of the organization. However, this study found that the changes to telecommuting limit newcomers’ participation and their accessibility to interactions with others. In terms of telecommuting, the non-face-to-face workplace environment makes it difficult for employees to feel connected to others in the “learning space” of the workplace or to form personal relationships ([Rifkin and Fulop, 1997](#)). The change to mass telecommuting has led to self-sufficiency in which employees have to learn, adapt and grow through their effort. Therefore, it could negatively affect their long-term learning and development while also increasing their difficulties in handling their work and decreasing their sense of belonging to the organization. In addition, at the organizational level, difficulties in developing and retaining talent could become an issue. These findings align with [Ropponen \(2025\)](#), who cautions that the long-term sustainability of remote work depends on addressing employee learning, well-being and talent retention in distributed work environments.

Exosystem level

At the exosystem level, company-initiated social programs shaped employees' social experiences but largely without replacing the organic socialization of physical workplaces. Passive participation suggests top-down interventions alone cannot address what are fundamentally relational needs (van Zoonen *et al.*, 2021). Ropponen (2025) and Pawluk De-Toledo *et al.* (2024) note that exclusion and isolation persist despite normalized remote work, with interpersonal factors producing diverse perceptions of organizational support, underscoring the need for more nuanced, employee-centered virtual social practices.

Macrosystem level

At the macrosystem level, Silicon Valley's performance-driven norms shaped how employees interpreted WFH's autonomy demands: those who had internalized the industry's self-motivation norms maintained or enhanced productivity, while others struggled once the office's implicit accountability was removed. Prior findings on remote work performance have been inconsistent (George *et al.*, 2022), and this study similarly found that performance depended considerably on the individual. As Luring and Jonasson (2025) note, hybrid work creates new inequalities tied to employees' capacity to exercise autonomy.

Chronosystem level

At the chronosystem level, the pandemic triggered simultaneous disruptions across all ecological layers, a sudden, indefinite, organization-wide shift that distinguished pandemic-era WFH from prior voluntary telecommuting. These were not merely individual adjustment difficulties but also an environmental rupture reshaping work and learning at every level. As remote and hybrid arrangements normalize, their lasting effects on relationships, collaboration and learning underscore the need for longitudinal attention to how ecological systems reconstitute themselves after such disruptions.

Implications

The pandemic has transitioned to a new phase, and organizations are adapting to a post-pandemic reality that still includes telecommuting and hybrid working environments. In light of this ongoing shift, there are significant implications for both HRD practitioners and research. This study's insights suggest the following key considerations.

Practical implications

First, training and support for inclusive virtual environments are essential. While online tools have enabled coordination, they can also generate alienation and collaboration challenges. At the microsystem level, HRD practitioners must ensure employees have not only access to effective tools but also the skills to use them inclusively. As telecommuting is prolonged, hybrid work formats that blend online and offline spaces should be considered as a structural response to these limitations.

Second, proactive and self-directed learning must be cultivated. Performance outcomes vary considerably across individuals, reflecting not only personal differences but also macrosystem-level cultural norms, particularly in Silicon Valley, where autonomous performance is expected but not equally accessible to all employees. HRD practitioners should develop evaluation frameworks that support self-directed skill acquisition and informal learning through social interaction.

Third, intentional organizational support for social interaction is required. Reduced social contact risks dehumanization and undermines informal learning and organizational

commitment (Ritzer, 2005; Lave and Wenger, 2001). At the exosystem level, organizations must move beyond voluntary social programs to actively promote conditions for relationship-building, while also developing leadership capable of sustaining employee autonomy and learning in remote and hybrid contexts (Pawluk De-Toledo *et al.*, 2024).

Finally, newcomers' adaptation and skill development issues need to be seriously considered. From the study's findings, newcomers frequently struggle to learn new tasks and adapt to the workplace in WFH settings because social interaction is limited and informal learning opportunities, such as on-the-job training and job shadowing, are constrained. For newcomers, informal learning through social interaction plays a critical role in organizational adaptation and socialization, as well as in skill development. This challenge is particularly salient at the mesosystem level, where the relational connections between newcomers, existing team members and broader organizational structures are severely constrained in fully remote environments. HRD practitioners need to discuss practical ways to form networks and learn organizational culture within a virtual workplace for the newcomers.

Implications for future research

This study reveals that WFH significantly limits opportunities for expansive informal learning through human interaction, while elevating the role of online tools in shaping workplace culture and relationships. Ecological systems theory provides a valuable multilevel lens for future research and theory development on remote workplace learning. Future research should examine the physical, psychological and social dimensions of WFH experience individually.

Based on ten cases from Silicon Valley, this study offers contextually rich but limited-generalizability findings. Future research should examine how disruptions at one ecological layer cascade across others, using larger-scale grounded theory or quantitative designs to establish causal explanations. Comparative studies across different industries, regions and demographic groups would further enrich understanding of how multilevel ecological conditions shape remote work and learning outcomes.

Conclusions

This study addressed the new working and learning phenomenon of WFH employees in Silicon Valley companies during the pandemic. By unraveling the changes within new normal situations, we also provide meaningful insights and practical implications into HRD practices in the prolonged telecommuting working environments. Viewed through the lens of ecological systems theory, the pandemic-induced shift to WFH was not merely a logistical change but also a simultaneous disruption across multiple ecological layers, one that calls for organizational responses addressing not just individual productivity, but the entire ecological context in which employees work and learn. This study also suggests the need for new perspectives beyond the current discussions of workplace learning regarding the new working and learning phenomenon within working from home environments based on empirical examinations.

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