

Challenges and Gratitude: A Diary Study of Software Engineers Working From Home During Covid-19 Pandemic

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Abstract— Covid-19 dramatically changed how organizations worked. Microsoft was one of the first to ask employees to work from home (WFH). We developed an anonymous nightly diary study with 435 participants and learned about their experiences over the first 10 weeks of the WFH directive. We found the largest challenges were having too many meetings, feeling overworked, and physical and mental health. However, engineers reported gratitude for family, increased flexibility, being employed, and team support. People who reported no gratitude were 22% (p-value=.000007) less likely to report being satisfied that day. Many people also reported that the simple act of reflecting nightly during the study was helpful to them. Our management used the anonymized, aggregate data to create new programs (such as No Meeting Friday) to address these challenges. We then saw immediate feedback on these programs in the diaries and used that to inform future decisions.

Keywords—Developer well-being, developer satisfaction, work from home, COVID-19

I. OVERVIEW OF THE TALK

This talk will describe a diary study conducted at Microsoft studying over 400 software engineers during the initial work from home directive during the Covid-19 pandemic. Software engineers filled out a diary study nightly for 24 weeks, and then continued to fill out the study twice a week (it is ongoing, currently in week 46, although this talk will cover results from the first 10 weeks).

The open text sections of the study were evaluated using an open coding format and thematic analysis was used to study major themes across the diaries over the weeks. These codes were validated by a subject matter expert outside of the study. After the first 10 weeks, participants completed a reflection survey on how the study was impacting them, what they were experiencing in the study, and how to move forward.

The talk will outline the major findings:

1) There are challenges during WFH that can be mitigated by management, leadership and software engineers themselves when those challenges are known and addressed

2) There are things to be grateful for during highly challenging times and these things can be amplified to improve mood and wellbeing of software engineers

3) The act of regular reflection on challenges and gratitude in and of itself is beneficial and allows software engineers to be more satisfied (and potentially productive) during their work day.

We found many common challenges including feeling overworked and a struggle with mental and physical health (physical issues such as increased repetitive strain pain, lack of movement, headaches, etc. and mental issues of isolation, depression and anxiety). We also saw problems with work life balance and an overload of remote meetings. Looking at how the different challenges engineers faced impacted their self-reported satisfaction with their workday we found that people were particularly less likely report being satisfied on days that they mentioned challenges related to "Overworked" (-13%, p-value=.002), "Motivation" (-21%, p-value=.0001), or "Focus" (-14%, p-value=.003). On days when people reported no challenges, they were 24% (p-value=6.6e-11) more likely to report being satisfied. Since some people may not want to report the same challenges day-after-day, we also look at whether someone ever reported a given challenge: ever reporting "Motivation" (-25%, p-value=.0007), "Mental health" (-15%, p-value=.046), and "Overworked" (-15%, p-value=.047) were most strongly associated with someone reporting being satisfied on less than 60% of their responses.

In addition, when looking at results from different groups, we found women were particularly likely to at some point report challenges related to "Motivation" (17%, p-value=.003), and "Focus" (15%, p-value=.014). Program managers tended to report more challenges than software engineers in general, and they were particularly more likely to at some point report challenges around "Overworked" (14%, p-value=.014), "Physical movements" (18%, p-value=.0008), and "Meetings" (18%, p-value=.007). In the other direction, software engineers were more likely than program managers to report challenges related to "Work space" (19%, p-value=.005) and (unsurprisingly) "Remote connection" (36%, p-value= 6.1e-8). Managers were much less likely than individual contributors to at some point report challenges related to motivation (-35%, p-value=.021) and "Collaboration" (-31%, p-value=.029) and

were much more likely to ever report challenges related to "Meetings" (35%, p-value= .027), "Kids" (35%, p-value=.022), and "Mental health" (36%, p-value=.018). In the talk we will also share specific verbatims from respondents that demonstrate what these challenges looked like in reality.

There were also common themes of gratitude, such as lack of commute, having their family around, supportive teams and great management. Again, some of these stayed consistent week over week, while others (such as commute), declined over time.

Women tended to report more distinct gratitudes; they were particularly likely to at some point report gratitude related to the "Comfort" of WFH (13%, p-value=.037) or their "Team" (22%, p-value=.0004). Relative to program managers, software engineers tended to report fewer gratitudes (both each day and ever mentioning them) in general, but they were particularly less likely to at some point mention gratitude for "Sun/window" (-13%, p-value=.038); however software engineers were more likely than program managers to at some point mention gratitude for Flexibility (15%, p-value=.032). Relative to individual contributors, managers were much more likely to at some point report gratitude related to "Exercise" (34% p-value=.012), but much less likely to report gratitude related to "Focus" (-35%, p-value=.025).

Interestingly, we also learned that the simple act of reflecting nightly during the study could be helpful: people who reported no gratitude were 22% (p-value=.000007) less likely to report being satisfied that day. This was not entirely unexpected, as prior literature promotes the benefits of practicing gratitude, however it was encouraging to see that this impacted software engineers' satisfaction in a statistically significant way.

This will be interesting to the audience of ICSE SEIP as it is empowering for software engineers, and their leadership, to learn that they can impact their satisfaction at work by reflecting on their day and making appropriate changes based on that reflection. During the study, the organization's management used anonymized, aggregate data to create new programs (such

as No Meeting Friday) to address challenges being report. Our follow up study found these had positively impacted the organization and helped people handle this difficult situation. Since we know satisfaction and productivity are linked, this (regular self-reflection) provides a simple way for software developers to improve their productivity, and a set of procedures for understanding the struggles in an organization and making appropriate changes.

II. SPEAKER INFORMATION

The authors both work at Microsoft in Redmond, USA, working on projects studying the new future of work.

Jenna Butler holds a PhD in Computer Science and studied Biochemistry prior to her graduate work in Bioinformatics. She is currently as Adjunct Professor at Bellevue College in the Radiation Therapy department and is a Senior Software Engineer working in Microsoft Research. Jenna has always had a passion for interdisciplinary work. The way different fields interact, and how different teams and viewpoints can lead to emergent and better behavior, is of deep interest to her.

Since joining Microsoft, Jenna has been involved in various research projects including How Shield Works in Office; How to Effectively Onboard and Train New Engineers; as well as the ongoing OXO-wide work from home study. She desires to study how software organizations can be more adaptable and resilient, and how they can better take on new challenges that arise due to both technical and non-technical changes in our world (for example, the move to the web or de-globalization due to Covid19).

Sonia Jaffe is a Senior Research Economist interested in a broad range of topics in applied microtheory. Her research has included projects in health economics, matching theory, public finance, and industrial organization. Recently she has been studying how remote and hybrid work affect workers and work practices.

Sonia received her PhD from Harvard University in 2015. She was a postdoc at the University of Chicago before joining Microsoft's Office of the Chief Economist in 2018.

Impact of study on control, well being and satisfaction

