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Blending Software Engineering with Remote Working - Results from an MLR

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Introduction

- Our research explores the topic of blending software engineering with remote working, primarily during the COVID-19 pandemic from January 2020 until January 2022.
- In order to keep our global economy functioning, many industries needed to partially, or in many cases, completely transition their workforce to remote working environments.
- We aim to explore how remote work has influenced the world of software engineering, and how the industry has transitioned from traditional on-site work, to operating remotely.

Research Methodology

- Each member of the team was first tasked with gathering relevant research papers regarding the topic of remote work and working as a software engineer during the COVID-19 Pandemic.
- Following the initial gathering of information, we then decided on key issues to focus on during our analysis, as well as research questions that we felt best highlighted these issues.
- When examining research papers, we executed search queries through the use of online search engines such as IEEE Xplore, Google Scholar, and Springer.
- We ranked the reliability of the papers in our initial findings, based on the number of citations, if the paper was peer-reviewed or not, and by evaluating whether it was relevant to our research or not.

Findings

- The four areas of investigation we decided to focus on are:
- **Productivity:** How has the transition to remote working impacted the productivity of software engineers?
- **Well-being:** How has the well-being of software engineers been affected by working remotely during the COVID-19 Pandemic?
- **Team Management:** How has software engineering team management evolved over the COVID-19 pandemic?
- **Future Recommendations:** What recommendations should be made to companies whose software engineers may wish to remain working remotely after COVID-19 restrictions are lifted?

Productivity

- We found that employees will on average do 26 hours more work per month as there is no longer a “hard stop” to signify the end of the working day.
- The productivity of software engineers largely depends on the characteristics of the project they are working on (eg. programming language, project age, project structure).
- There are many challenges affecting the productivity of developers while remote working.
- Developers self perceived productivity

Well-being

- Well-being while working remotely largely depends on a person's emotional stability
- Overworking and too many meetings is a big problem when working remotely
- There has been a major decrease in lunch hours taken and the number of social interactions while working remotely
- Flexible working schedules have resulted in an increase in daily working hours

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Team Management

- Team management skills were put to the test
- New communication tools (Zoom, Microsoft Teams, and Slack)
- Workers reportedly felt less connected
- Agile methods can still be achieved online

Future Recommendations

- Performance, productivity, and team collaboration
- The importance of flexibility to software engineers
- Hybrid work may be the ideal solution for many software engineers
- This enables businesses to closely monitor performance working while also allowing for social interactions in the workplace

Research Limitations

- Due to time constraints, our research could have been much more complete and efficient
- Nowadays, workers are used to working remotely since the COVID-19 restrictions were put in place, but initially, many people reported that they felt “restricted” and “trapped” when working from home
- Given the secondary data from our research, it is possible that circumstances may have somewhat changed since the time these studies were conducted. This suggests that up-to-date studies may be required.

Conclusions

- From our research, we found that the shift to remote work does not affect the productivity of software engineers as a whole, but at an individual level.
- The experiences of software engineers in regards to their physical and mental health have also been varied.
- Businesses should carefully consider the wants and needs of their workforce
- We believe that a hybrid approach would be a safe option for many companies

Future Research Directions

- If in the future, a team is conducting similar research, we would suggest that collecting their own data or finding more recent studies may be beneficial to them, given that much has changed since the beginning of the COVID-19 pandemic.

- Perhaps a more in-depth analysis on the differences brought about by the subtle changes that software engineers now face in their everyday life, and the impact of these changes, would be a positive direction for future research related to this topic.

- We can imagine in some years time that there would be much more to talk, regarding the world of remote software engineering, as the way we work today could be entirely different to how we work in the future. This leaves the door open for the exciting possibility of new research to be carried out.

Thank you

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