

Data sensors for safety, but not surveillance: skilled trade workers express excitement for smart hand tools, but raise privacy concerns

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Introduction

Our recent research found that **skilled trade apprentices were not concerned about AI replacing them** and believed that smart hand tools could improve safety (McCullough et al., 2025). Introducing new technology from the “top down,” however, risks infringing on workers’ ability to “exercise labor rights, build collective power, and exercise autonomy at work” (Weil, 2019).

Skilled trade workers, who were weary of workplace surveillance, emphasized the importance of their agency in technological design (McCullough et al., 2025). This aligns with discussions around “worker-led technology design [being] ... a key step to ensure fair working futures” (Calacci, 2022). **In this most recent iteration of the Smart Hand Tools project, we turn once again to workers to learn their perspectives on AI, agency, and data ownership.**

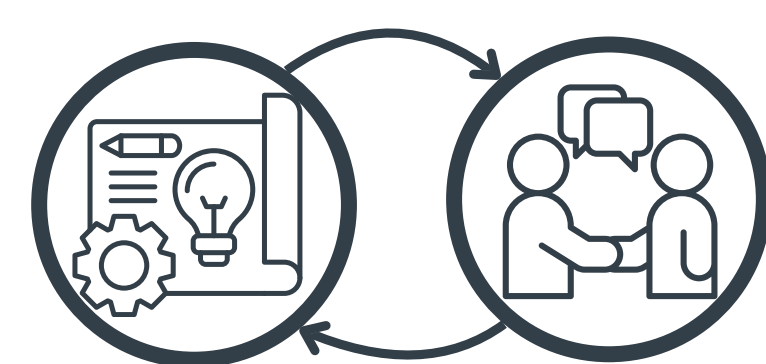
Research Goals

Our current research **validates and expands upon previous findings** (e.g., safety is a priority to skilled trade workers), expands to **non-apprentice** workers, and explores their perceptions of data collection and **surveillance**. These goals come in tandem with advancements towards creating a **modular prototype sensor unit**.

Methods

Engineering
Iterative Design & Prototyping

Social Science
Survey (n=36)
Interviews (n=18)



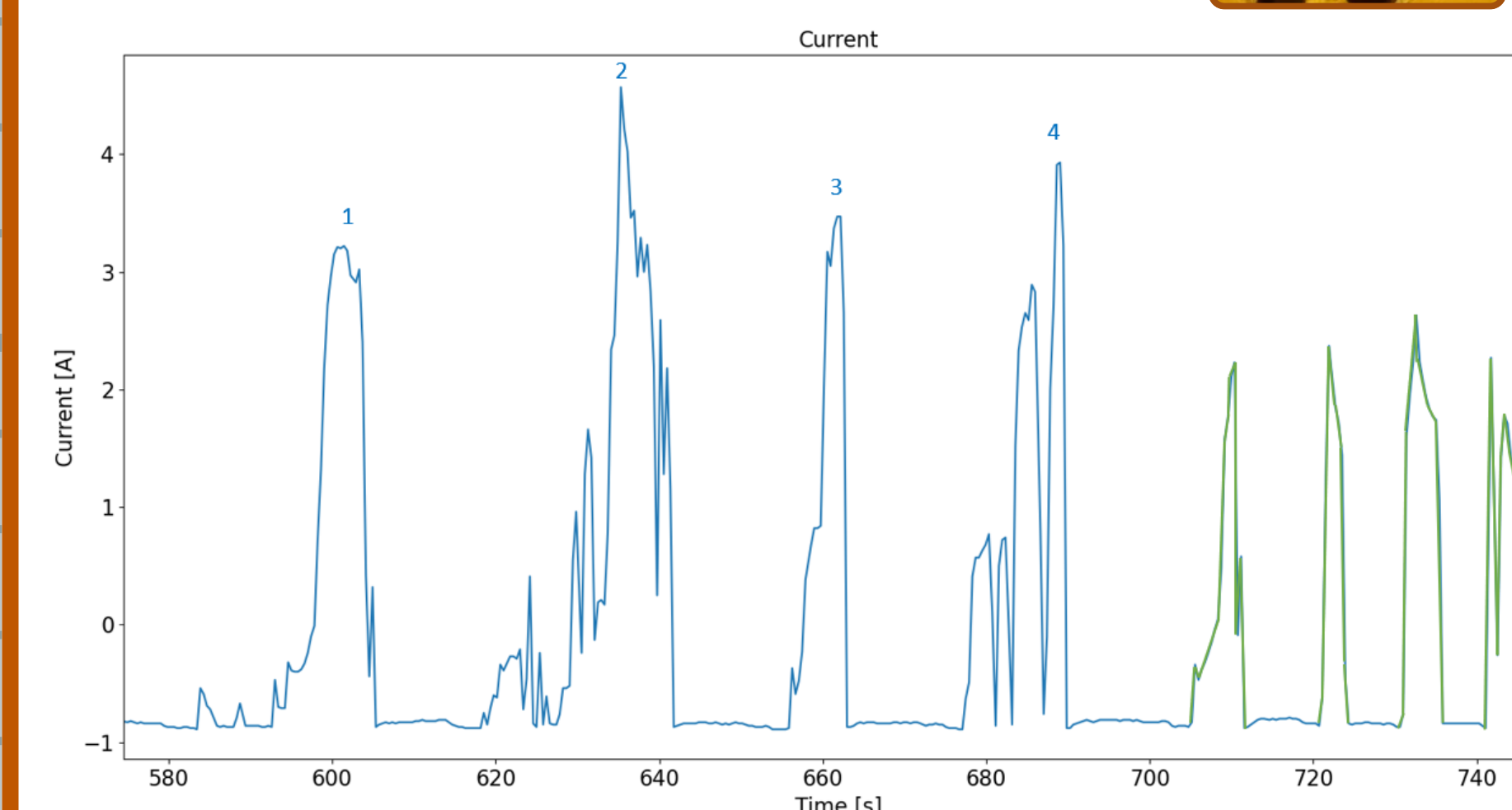
Participants: unionized skilled trade workers
Frame: developing a modular data collection system which can attach to hand tools; worker perceptions of AI, data collection, agency, and privacy.



Current Work

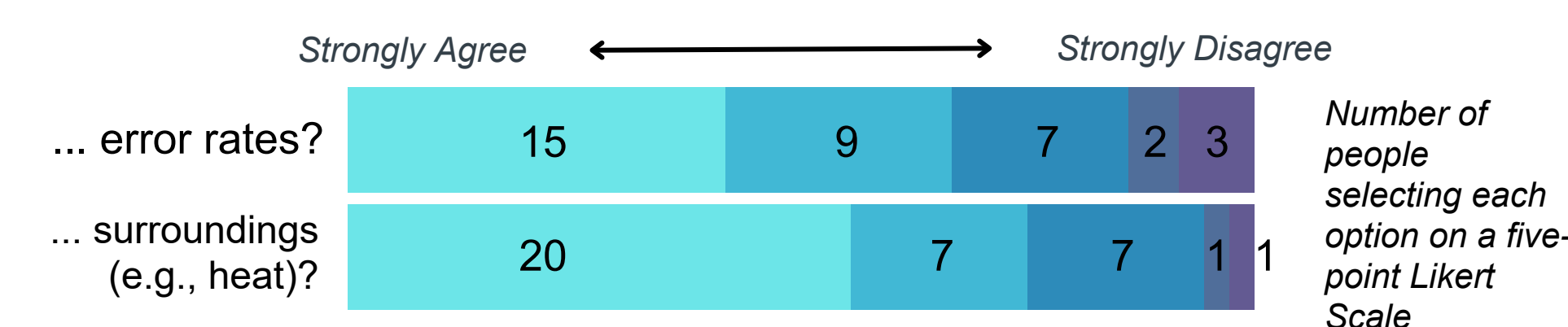
Modular data collection system: The engineering team has developed a modular prototype sensor unit, compatible with multiple tools such as a drill (left). Using a **prototype sensor unit (a.)** and **voltage regulator (b.)**, the device can record electric process parameters to map performance over time (Salazar et al., 2025).

Sensor measurements of current (A) across time (s) as an electric drill is used

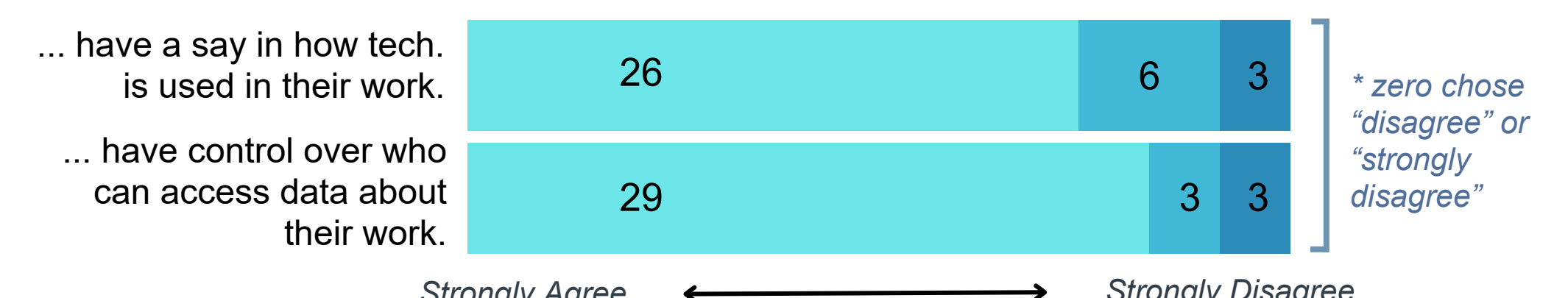


Participant Attitudes Towards Smart Hand Tool Data Access, Agency, and Privacy

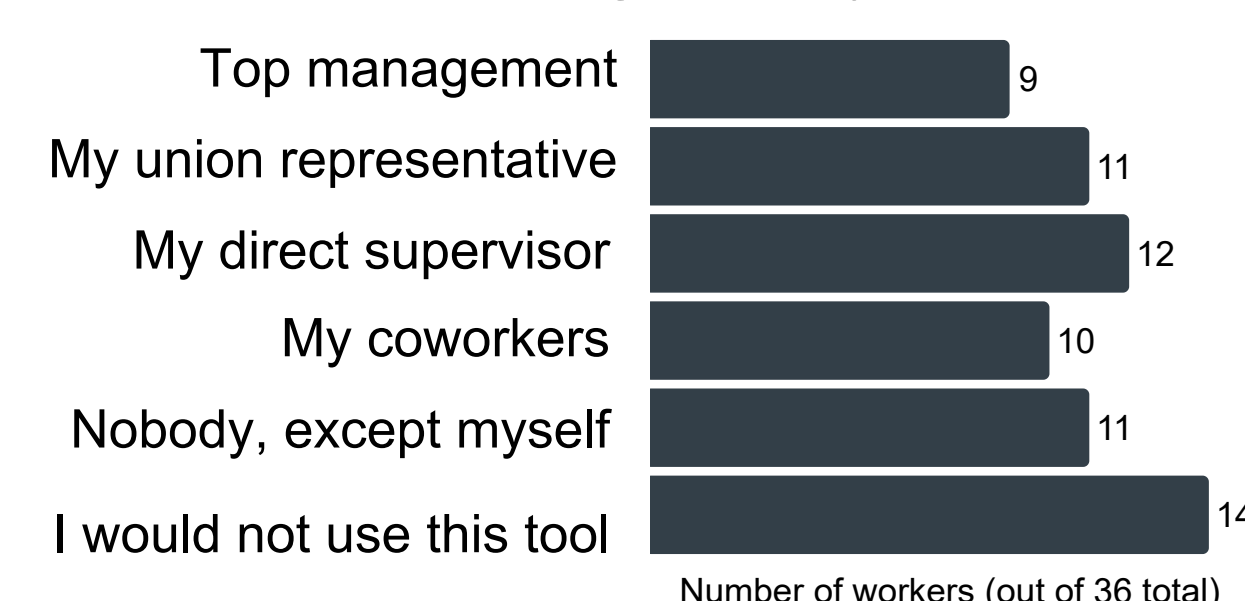
How useful would it be to see anonymous combined data about ...



It is important that workers ...



I would be comfortable sharing anonymized tool data with ...



Semi-Structured Interviews

“Information from a lot of people would come in handy to actually, like, train people the right way ... to understand what people are doing wrong and kind of, like, remedy that” (P2).

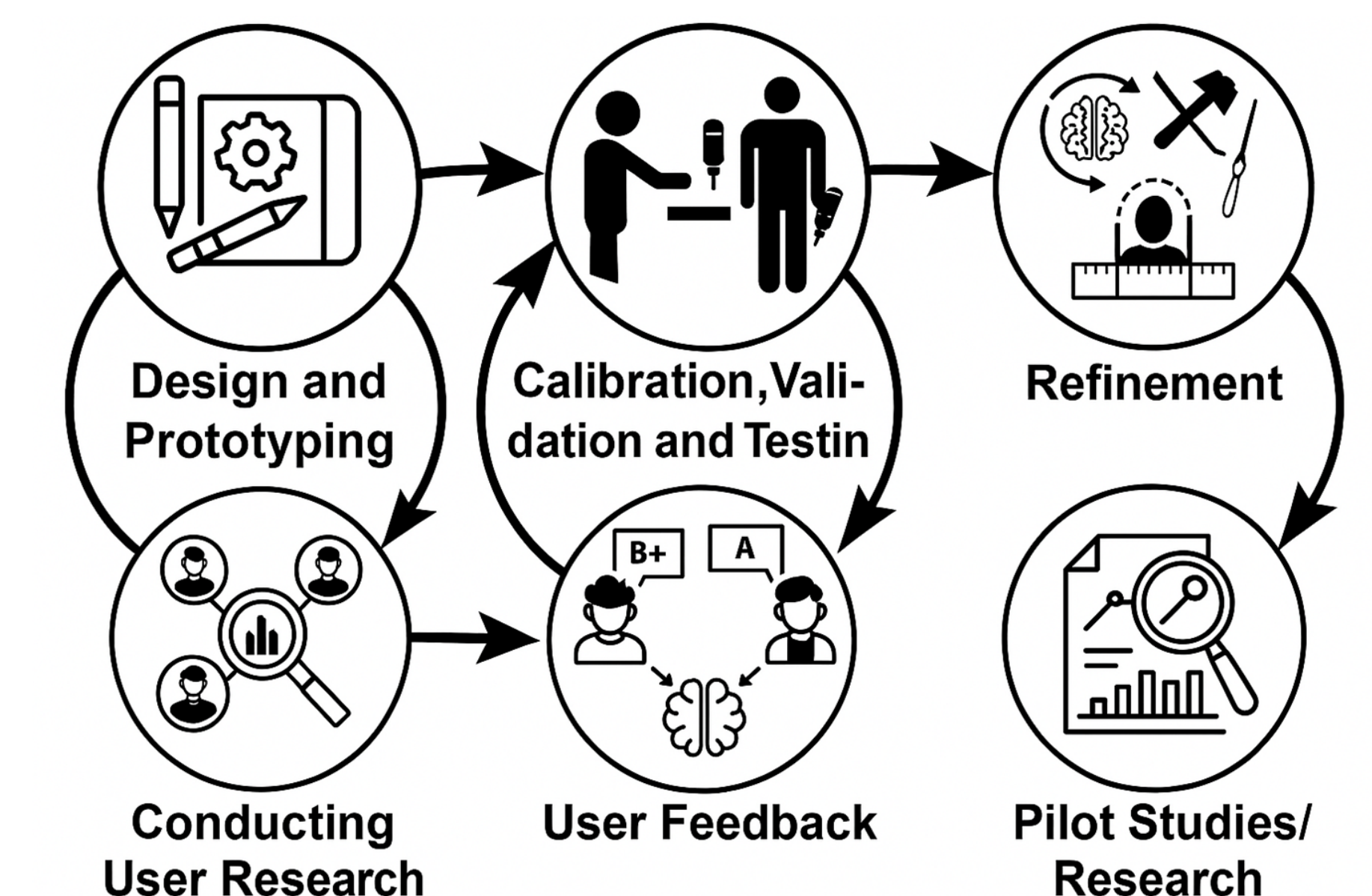
“[Tool data] would help me specifically, and I think it’ll help the trade too. Having something to tell you all the data in real time ... I can learn in the next [try] and implement” (P13).

“It’s playing a dangerous game. ... If job site A and B have the same tools, ... [but] A has ... triple the statistics of B ... that could ... lead to confrontation” (P24).

Conclusion

Discussion: emerging themes validate the decision to create a sensing unit that is removable – one that can be attached by individual workers who retain agency over their own data.

Next Steps: future research will focus on continued analysis of survey and interview data. Later iterations of the project will place the tool in workers’ hands for user feedback.



Acknowledgements

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References

- Calacci, D. (2022). Organizing in the End of Employment: Information Sharing, Data Stewardship, and Digital Workerism. *Proceedings of the First Annual Symposium of Human-Computer Interaction for Work* (p. 1-9).
- McCullough, C., Needle, J. P., Triem, H., Fleischmann, K. R., & Greenberg, S. R. (2025). “AI Is Not Gonna Take Our Jobs”: Perspectives From Skilled Trade Labor Union Apprentices. *IEEE Transactions on Technology and Society* 6(4).
- Salazar, C. D., New, R., McCullough, C., Lassiter, T., Fleischmann, K. R., Greenberg, S. R., Sha, Z., & Longoria, R. G. (2025). Design, Development, and Testing of Smart Hand Tool Systems. *Proceedings of ASME IDETC*.
- Weil, D. (2019). Understanding the Present and Future of Work in the Fissured Workplace Context. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 5(5), p. 147-165.