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## EDITORIAL

### Situated engineering in the workplace

With the exception of a few pioneering studies, scholarly attention devoted to the engineering workplace has been disproportionately low given the insights that can be gained from a closer examination of engineers at work.<sup>1</sup> The engineering workplace deserves intimate investigation because it reflects the dynamic and complex nature of engineering practice, the constant renegotiation of boundaries around engineering work and the dynamicity of engineering identity. Examination of engineers at work is also important because it sheds light on potential and actual tensions between the preparation of engineers and the contents of engineering practices. This theme issue of *Engineering Studies* on 'Engineers and the Workplace' begins to fill this void by improving our understanding of what engineers actually *do*. Scholars whose work is included here achieve this goal through in-depth analyses that illuminate the situated aspects of engineers' lived worlds.<sup>2</sup>

In the leading article, Kevin Anderson, Sandra Courter, Thomas McGlamery, Traci Nathans-Kelly and Christine Nicometo present findings from a study of engineering work across six engineering firms that examined engineers' self-valuation of important work characteristics. They found remarkable similarities across settings in which most engineers saw their work as collaborative problem solving. The authors find that 'most of the engineers in our study did not see themselves as being engineers in order to contribute to the general public good. Their identity was more likely to be grounded in solving problems well—for themselves, for their team, for their organization, and for their client.' Engineers valued communication skills, problem solving ability, learning on the job, and working in a team, more than other aspects of their jobs, and were consistently struggling with a tension between authentic and non-engineering work. This study provides a useful cross-case understanding of commonalities in engineering work practice embedded in diverse settings with implications for preparation of future engineers and for situated support of engineering work.

In the second article, James Trevelyan draws on observational study of all main engineering disciplines and across settings in Australia and South Asia to argue that although the prevailing narrative of engineering practice emphasizes its technical nature, in practice, engineers not only relegate social aspects of their work to the periphery but often undervalue critical technical aspects. Furthermore, the author argues that a social/technical dualism belies the reality of engineering practice where the social and technical are highly intertwined and the foundation of engineering

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1. Although scholars in organization studies have examined the engineering workplace, their intended goal has been to shed light on managerial issues in these settings. Engineers and engineering practice have found favor with some scholars, notably Steve Barley and Gideon Kunda (2001) have argued for more attention to studies of engineering work practices.

2. Scholars from the situated tradition whose work is cited commonly across articles in this issue include Ed Hutchins, Jean Lave, Lucy Suchman, and Etienne Wenger, among others.

practice is ‘distributed expertise’ – the harnessing of tacit knowledge, expertise, and skills, spread across people. The vibrancy of this manuscript emerges from the diversity of views that the author is able to bring to bear on the issue at hand. The author lays out several interesting implications of this study for engineering education where the social is relegated to the periphery in a curriculum crowded by the teaching of engineering science concepts.

Julie Gainsburg, Carlos Rodriguez-Lluesma, and Diane E. Bailey studied structural engineers to evaluate the usefulness and prevalence of formal education versus knowledge built from experience and practice. They appropriate a behavioral perspective and examine ‘stream of behavior’ employing a unique methodology whereby they develop episodes of knowledge use by engineers and create a knowledge profile of their work. They then code each episode for three values: knowledge type, knowledge derivation, and project phase. They undertake a detailed comparison of temporal patterns across knowledge types to show that the use of knowledge type is related to the project phase. Their work is exemplary not only for its finding that practice-based knowledge is often more important overall but also because of its methodological inventiveness and rigor.

In the final paper, Gian Marco Campagnolo and Giolo Fele examine the interaction between system and design engineers to analyze negotiations that occur around a software modeling tool. The authors situate their work in the ever-increasing practice of the purchase and use of standardized software packages, a practice that creates a situation where the tool functionality has to be specific enough so it can be sold as a solution but vague enough to convince the client that the tool can be adapted to their specific needs. The authors identify three focal points around which the negotiations occurred between system engineers and design engineers – the number of functions, the range of functions, and their degree of integration.

Within the rich diversity represented in these articles, a common theme that emerges is the focus of authors on the situated nature of engineering work and their ability to draw useful lessons from a close inspection of engineers’ practices. Drawing on their empirical evidence the authors illustrate that engineers have to act under severe constraints, they have to bring to bear diverse kinds of knowledge to the problem at hand, and they have to keep learning and reinventing themselves. One purpose of this issue has been to make visible these tacit but critical aspects of engineers’ work and to argue that future studies in this tradition can help create an even more nuanced understanding of what engineers do and what that means for who they are and how they develop their identities and knowledge.

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## Reference

- Barley, Stephen R., and Gideon Kunda. “Bringing Work Back In.” *Organization Science* 12, no. 1 (2001): 76–95.