

Engineering as Performance: An “Experiential Gestalt” for Understanding of Engineering

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1. INTRODUCTION

Engineering practice has long been a topic of interest. More recently, much of that interest has focused on exploring, perhaps even attempting to define “the [essential] nature of engineering and engineering beliefs, values, and knowledge” (Pawley 2009). The motivation seems to be that a better understanding of the nature of engineering will suggest better approaches to teaching engineering, e.g. problem-based/project-centered learning (Sheppard et al. 2009) or “the CDIO approach” (Crawley et al. 2007). While proponents are quick to acknowledge the critical importance of “learning how to communicate,” “learning to work in teams,” or “learning to acquire attitudes of persistence, healthy skepticism, and optimism;” their primary aim in looking at and characterizing engineering practice is to develop “professionals who are . . . technically competent because being technically competent today and tomorrow is a natural outcome of the conception of the engineer as professional” (Sheppard et al. 2009).

Somewhat alternatively however, there are a growing number of qualitative and/or ethnographic-like studies that are investigating real world engineering practice. And, rather than focusing only on the technical competencies per se, they reveal “the significance of social relationships” within a range of different engineering contexts (Bucciarelli 1994; Downey 1998; Vinck et

al. 2003). In this regard, James Trevelyan (2007, 2009) is doing some very interesting research. Using interviews and direct observations, he offers an understanding of engineering practice as “technical coordination” (Trevelyan 2007). According to Trevelyan,

[t]he engineers we interviewed devoted little of their attention to hands-on technical work. . . . The evidence showed that engineering work was coordinated and driven by engineers, but the end results were delivered through the hands of other people. The link between engineers and the ultimate production and service delivery was a complex series of social interactions” (2007).

He claims that such an understanding facilitates the important recognition that “engineering is [both] a technical and a social discipline . . . [and that] the social and technical are inextricably intertwined” (Trevelyan 2009). In a later paper and apropos to his apparently different understanding of engineering practice, he claims that there is a “fundamental misunderstanding” of communication (Trevelyan 2009). The dominant yet limited view in engineering is that communication is simply “a one way information transfer” (Trevelyan 2009). However, Trevelyan (2009) suggests that such a view belies the “realities of [authentic engineering] practice . . . [and] the means by which complex interactions are sustained.” As a sociolinguist, I certainly agree that a one way information transfer understanding of communication seriously lacks both descriptive and explanatory power, and thereby trivializes the role of communication in engineering. More about that later in the paper.

Still, these two perspectives – one emphasizing the technical and the other the social – strike me as similar to Bucciarelli’s (1994) characterizations of the *savant* and the *utilitarian*. For the savant-like students of engineering practice, technical knowledge is determinate. Whether that knowledge is applied through problem-solving or through design (or some combination of both or others) matters less than that it is technical and applied in some systematic way because

that is the essential nature of engineering. On the other hand, for the utilitarian-like student of engineering practice, social process appears to be determinate. While the technical is certainly “inextricably intertwined” with the social, the emphasis now falls on the communal process, that which seems at least to the experience of engineers to be “uncertain,” “ambiguous,” [and maybe even] “nonrational” (Bucciarelli 1994). Bucciarelli (and I agree) criticizes both the savant and the utilitarian perspectives as being abstracted from engineering practice itself and more than a little tautological.

In part, what has led me to propose the metaphor of performance as an alternative to practice (itself also a metaphor, by the way) is that the latter seems to maintain the dichotomy of science vs. non-science, technical vs. social, the hard skills vs. the soft skills in a way that anticipates, even predetermines the results of any investigation as well as the possible conversation and reflection about the implications of that investigation. I believe understanding engineering as performance will free us from that dichotomy and allow for a more open-ended investigation, conversation and reflection. In addition, I believe about engineering and about being an engineer something similar to what Judith Butler (1990) believes about gender – that “[it] is in no way a stable identity or a locus of agency from which various acts proceed; rather it is an identity tenuously constituted in time – an identity instituted through a *stylized repetition of acts*.” Consequently, I believe that if we can study the “performative accomplishment” that is engineering and being an engineer; then, perhaps we can also develop a genuine appreciation for all the ways that engineering and engineers can and do make a difference in the world (Butler 1990).

Next, I offer an understanding of performance, “an essentially contested concept” and borrow very eclectically from just a few of the possible

fields/disciplines – sociology (Goffman 1959, 1974), anthropology (Turner 1974, 1982), linguistics (Hymes 1974, 1975; Bauman 1977, 1986, 1992), literary and rhetorical studies (Burke, 1962), theatre and/or performance studies (Schechner 1977, 2002), even philosophy (Butler 1990) – to describe it (Strine et al. 1990). Then, since my particular interest is language use in engineering, I discuss the ways that performance helps us to better understand communication. Communication, in conjunction with other ways of doing in engineering, is an ever varied and variable collection of situated and recurring actions relevant to purpose. Understanding communication in this way not only helps us to appreciate the real role of communication, but by extension the real role of other collections of situated and recurring actions – ethics, aesthetics, politics, culture – all similarly relevant to purpose. Finally, I suggest that the concept performance represents a better “experiential gestalt,” or “a structured whole within our experience,” one that will allow us to explore the many and various possible constructions of engineering and being an engineer all in terms of *doing*, *re-doing*, and *showing doing* (Lakoff and Johnson 1980).

2. PERFORMANCE: “AN ESSENTIALLY CONTESTED CONCEPT”

Marvin Carlson, in his seminal book, *Performance: A Critical Introduction*, begins his concluding chapter stating that “[s]o much has been written by experts from such a wide range of disciplines, and such a complex web of specialized critical vocabulary has been developed . . . that a newcomer seeking a way into the discussion [about performance] may feel confused and overwhelmed” (Carlson 1996). Certainly, in my brief introduction of performance, I do not expect to eliminate that confusion. Rather, I intend a simple (and inevitably somewhat simplistic) presentation, attempting to distil from this

essentially contested concept, a few key ideas that I believe are especially relevant to the understanding of engineering as performance.

Performance or performing is *doing*; it is *re-doing*; and it is *showing doing* (Carlson 1996; Butler 1990; Schechner 1977). To say that performance is doing emphasizes the importance, indeed, the primacy of action and acting. It highlights someone, often a performer (although sometimes not recognized as such) but quite possibly (and more often) an assembly of performers, who in some context engage(s) in activities associated with some endeavour for some purpose(s). Ultimately, according to Kirshenblatt-Gimblett (1998), “[i]t is about getting something done” (1998). Richard Bauman (1992) suggests that there are two general kinds of performances: “aesthetically marked” and “aesthetically neutral.” Aesthetically marked performances are heightened modes of action. They are “set up and prepared for in advance” (Bauman 1992). They are temporally and spatially bounded. There is a structured sequencing of actions or an established process. And finally they have the feel of an occasion, an event that is “open to view by an audience and to collective participation” (Bauman 1992). Aesthetically marked performances are also sometimes referred to as “cultural performances” (Kirshenblatt-Gimblett 1998). The formal presentation at an academic conference is such a performance. Aesthetically neutral performances most surely involve actions, but unlike an occasion or event, they are not nearly as scheduled, bounded, or programmed. And, if they have a feel, it is that of the mundane. An aesthetically neutral performance is “all the activity of a given participant on a given occasion which serves to influence in any way any of the other participants” (Bauman 1992). The conversation following from such a presentation over coffee or dinner is a possible example of an aesthetically neutral performance.

Clearly, we all can imagine different examples and examples in which it would be difficult to separate an aesthetically marked from a neutral performance. Consequently then, it is important that we attend to Richard Schechner's (1992) suggestion that there is actually a continuum of "various kinds of performing" that extends, similar to Bauman's kinds of performances, from the "large-scale public events and rituals . . . to the great and small roles of everyday life." All of which are, to reiterate, about getting something done.

Performance is also a re-doing. A performer who engages in particular activities never does so apart from a history of like activities or the present-in-time conventions that guide them. Rather than history and those conventions, while they may not wholly determine what practices and activities are possible, certainly provide a conceptual framework that suggests which are appropriate, effective, and even efficacious. Schechner (2002) names re-doing "restored behaviour." Restored behaviour are "routines, habits, and rituals; the recombination of already behaved behaviours" (Schechner 2002). He claims that there are no *new* or *original* performances. There is never a "first time" (Schechner 2002). However, because the activities that make up a performance are never new or original; they are marked, can be identified, and therefore can be "worked on . . . played with, made into something else . . . [even] transformed" (Schechner 2002). Re-doing is acting with an appreciation of the history of past action and of the conventions that direct current action and the understanding that made that history, formed those conventions. Re-doing both allows the rituals of the past and the routines of the present to direct, and yet, allows for variation as well – wandering in doing. So, just as the activities related to giving papers at academic conferences are always a re-doing – they most certainly involve routines, habits, and rituals; so the activities related to performing within one's

particular profession – engineer, lawyer, doctor, teacher, and factory worker – are always a re-doing. Indeed the different histories and conventions are what separate those professions.

Finally, performance is showing doing. Showing doing is a kind of display of our awareness (Kirshenblatt-Gimblett 1998). First, showing doing is a display of our awareness of our own distinctive agency – that certain activities constitute a particular way of doing. Second, it is a display of our awareness that that doing is a re-doing. Showing doing acknowledges the understanding, reveals an appreciation of the history and the conventions related to doing – that certain activities have preceded ours, that certain other practices and activities surround and are contemporary with and influence ours. And third, showing doing is a display of our awareness of our selves as actors, or better, performers engaged in doing and re-doing. It is a display of our awareness that our identity as a particular kind of performer is constructed and represented through those very activities. I suspect that we all as academic presenters at this conference and others are aware of ourselves as performers, are aware of how this performance is enacted, and are aware (or at least hopeful) that our performances reveal agency – contribute to getting something done. However, underlying the notion of display is the presumption of an audience for that display, someone else who attends, who through attending to that display in some way participates. The nature of that participation can be various: observational (spectator), experiential (participant), evaluative (critic), and so on. So, while showing doing is a display of our awareness of doing, re-doing, and through doing and re-doing our identity; it is also always a display for someone else. That it is a display for someone else makes showing doing reflexive or it creates the opportunity for those of us who participate to think about what a particular performance has to do with our

professional life as we choose and continue to choose to live it. It even encourages us – the often-stated aim of our academic conferences – to explore the extent and the limits of our own awareness.

There is a common misunderstanding of performance that, in turn, might have an impact on how useful performance is in helping us to better represent engineering, what it means to become an engineer, even the teaching and learning of engineering. The misunderstanding is that performance is often thought of as *a mere show, something of a spectacle, a simple demonstration*. Something not really work. Nothing could be further from the truth. At this conference, for example, performance is always purposeful. The performers are always doing, re-doing, and showing doing. And their performances are, after all, about getting work done, whatever the work may be.

3. ENGINEERING AS PERFORMANCE AND COMMUNICATION

Earlier I stated that understanding communication as a one way information transfer (otherwise referred to as the conduit or process model of communication) has neither descriptive nor explanatory power. In fact, while information is typically transferred in communicative interactions, there has been a growing consensus that communication is more, much more. Instead, communication – reading and writing, speaking and talking, or our many other ways of using language – is actually a collection of activities – individual and social actions – that are as foundational, as fundamental to any professional (as well as personal) performance as are any other. Indeed, in the College of Engineering at Cornell University, I have long been advocating for an understanding of communication as action, as always and everywhere situated, as learned through processes of participation, and as sometimes instrumental,

representative, and even constitutive of doing the real work of engineering. This way of understanding communication can be generally labeled as the “genre perspective” (Bhatia 2004).

There is a vast literature relating to this genre perspective. Much of it is very interesting and applicable. Too much to review here. However, there is one approach that is perhaps immediately relevant to our particular focus on engineering as performance and the doing, re-doing and showing doing of engineers. It is what Charles Bazerman (1999) calls “the North American approach to genre.” According to Bazerman (1999), this “North American approach to genre directs our attention to the typification of rhetorical action – that is, the repeated communicative actions people do with each other, the repeated forms by which they do it, and the interpretive practices by which they recognize what they are doing.” In other words, genre refers to those particular actions related to communication that are typically, routinely, and (I would argue) necessarily part of professional work, or more narrowly part of the work of engineering.

Further, he suggests that this approach also “directs our attention to the historical emergence of . . . [communicative action], the current social organization of communication, and [engineers’] strategic use of [conventionalized] forms to participate in socially organized activities” (Bazerman 1999). In other words, genres have histories and present-in-time conventions that relate to communicative action in context. That history and those conventions provide a scaffolding for engineers participation as language users, for enacting those genres in ways that are appropriate, effective, and efficacious. Bazerman (1999) goes on to suggest that this approach attunes engineers “to the particularity of [the] processes” [of their participation] . . . by showing [them] how

specific texts [examples of particular genres] functionally mediate the socially organized . . . [work] of engineering.”

Finally, he concludes that a genre-based . . . approach toward communication or language use in context not only helps engineers develop an understanding communicative activities necessary for the conduct of their professional work, but also provides them with analytic tools and a framework to recognize and adapt to “the changing genre landscapes that their professional lives will travel across” (Bazerman 1999). In other words, once engineers understand that genres perform particular and necessary actions – literally do engineering work; once they learn to appreciate the history and conventions that inform how that work gets done – can take advantage of the traditional as well as the current scaffolding for doing that work; then those engineers can begin to understand their own agency and identity as a performer – as engineers engaged in doing and re-doing in evolving and new contexts. In addition to understanding themselves as engineers, they are also representing – performing, if you will – themselves as engineers to others. It is that performance for others that encourages reflexivity, to choose and continue to choose how they might realize engineering through being an engineer.

Clearly, I am claiming communication is performance and that, in ways particular, it is a part of and not apart from the performative accomplishment that is engineering. It is *doing* through the genres that engineers use to get things done. It is *re-doing* in that all those genres emerge from a history of use in engineering and adhere to conventions that relate the form of that communication to an engineering context. And it is *showing doing* in that both doing and re-doing are revealed along with the agency and identity of engineers to others and even to themselves. Communication is not science or non-science, technical or social, a

hard skill or a soft skill. Rather, engineering communication is action, always and everywhere situated in engineering contexts, learned through processes of participation as an engineer, and sometimes instrumental, representative, and even constitutive of doing the real work of engineering. And, if communication can be so understood – why not then those other actions non-science, social, soft – ethics, aesthetics, politics, culture. After all, all can be understood as doing, re-doing and showing doing. Again, to understand engineering as performance, as a performative accomplishment, allows us to investigate all of the above as well as science, the technical, and the so-called hard skills as vital part of the real work of engineering.

4. ENGINEERING AS PERFORMANCE: AN EXPERIENTIAL GESTALT

In their book, *Metaphors We Live By*, Lakoff and Johnson (1980) dismiss the idea that metaphors are “just a matter of language, and can at best only describe reality.” To accept such a point of view is to conflate the study of reality with that of the physical world, in effect to leave out the “human aspects of reality, in particular real perceptions, conceptualizations, motivations, and actions that constitute most of what we experience” (Lakoff and Johnson 1980). Instead, they suggest that metaphors provide an “experiential gestalt,” or “a structured whole within our experience” (Lakoff and Johnson 1980). Metaphors help us to find coherence. Metaphors help us to impose meaning, literally, to make sense. However, in a chapter entitled, “New Meaning,” Lakoff and Johnson (1980) admit “that new metaphors make sense of our experience in the same way that conventional [older] metaphors do . . . highlighting some things and hiding others.” The actual usefulness of a metaphor resides in what it highlights and in what it hides.

Practice and performance both highlight the everyday activities of engineering and engineers. Yet, practice attempts to highlight the distinctive, the essential; and to hide that which seems marginal, not perhaps unnecessary, but certainly ancillary. So science, those activities that are considered technical, the so-called hard skills – they are engineering. They define what it means to be an engineer. Practice hides those activities that seem marginal, that which is considered not to be science, whatever is considered to be social, and to involve the so-called soft skills. And, even when the practice metaphor fails, as in Trevelyan’s research, those who have adopted the metaphor still find a way to assert science, the technical, and those hard skills – engineering is still *technical* coordination. Further, in ways that are false I believe and certainly exclusive, practice highlights being technically competent as if being technically competent is the real “natural outcome of the conception of the engineer as professional” (Sheppard et al. 2009).

While it also highlights the everyday activities of engineering and engineers, performance does so as a genuine ensemble. Again, as an ensemble, whatever is doing, re-doing, and showing doing – like communication – in an engineering context is engineering; and, along with all the other ways of doing, re-doing, and showing doing can define what it means to be an engineer. There is no dichotomy of science vs. non-science, of the technical vs. the social, of the hard skills vs. the soft skills – all are united in the ensemble. Performance, however, does hide the essential, that which is engineering and nothing else. The identity of engineering and the identities of engineers, to refer again to Judith Butler (1990), are “in no way a stable;” they are “tenuously constituted in time;” they are a *stylized repetition of acts*.” Further, through this identity and/or these identities so constituted or, better, continuously constructed; performance

highlights in ways now more complex and I would argue more inclusive how engineering and engineers can and do make a difference in the world. The focus changes from what is distinctive about engineering and about the individual engineer to the “performative accomplishment” that is engineering and the actual performances of engineers (Butler 1990). To massage the phrase of Kirshenblatt-Gimblett – engineering as performance is about what gets done in order to make a difference in the world!

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