

6. Functional Flexibility: Cultivating a Culture of Adaptability for the Work of Professional Writing

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Abstract

Contemporary workplaces are constantly evolving and complex and require professional writers to have a breadth of expertise and skill sets that enable them to adapt and take on multiple roles in and across diverse work units and teams. Rather than reaffirm the need for adaptability, this chapter provides a new way of thinking about workplace adaptability through theorizing a model of functional flexibility that describes how professional writers collaborating on teams can be adaptable in light of the relational, oftentimes tacit, barriers that precede and spur the need for adaptation. The authors assert that developing insights about such barriers is an essential first step to developing any model about how professional writers can be adaptable and work effectively, efficiently, and economically—that is, to be functional—in dynamic workplace cultures so as to participate in the rewriting of work rather than be rewritten by it.

Keywords

adaptability, collaboration, teams, organizational communication, workplace culture

Contemporary workplaces are constantly evolving and simultaneously global and local (Spinuzzi, 2007). They are temporally diverse, distributed, and ad hoc in nature (Spinuzzi, 2007, 2014). They require employees to have broad expertise and skill sets that enable them to perform multiple roles in and across diverse units and teams (Dusenberry et al., 2015; Hart & Conklin, 2006; Ranade & Swarts, 2019). In essence, workplaces are unstable and pose unique challenges to employers and employees alike. To respond to this workplace reality, employers strive to build a workforce of individuals with broad technical (e.g., tools, languages, development and design) and interpersonal (e.g., communication, collaboration, creativity, empathy) skills flexible enough to keep pace with or even outpace the forces of change that shape the contours of work (Brumberger & Lauer, 2015; Lanier, 2009; Lucas & Rawlins, 2015). Professional writers (PWers) have been

identified as just the group of professionals well-suited to this new workplace reality. Despite the positive recognition, there is an underlying awareness and tension, what some may call an anxiety, amongst PWorkers that they cannot keep pace with persistent, evolving workplace demands. Evidence of this anxiety manifests in continuing calls for PWorkers who can continuously adapt and respond to these very demands (Henning & Bemer, 2016; Johnson-Eilola & Selber, 2012). For many, adaptability is the lynchpin of success, the core capacity for getting things done and participating meaningfully in the knowledge work that defines contemporary workplaces (Dusenberry et al., 2015, Henning & Bemer, 2016, Myers, 2009).

We enter this conversation motivated to develop new ways of thinking about workplace calls for adaptability. Rather than reaffirm the need for adaptability, we want to develop a model that expresses how to be adaptable in the face of evolving work. To think through the *how* question, we use as a case study Mark's experience working as a PWorker on a cross-disciplinary/boundary team adapting to emergent work demands.¹ The cross-boundary team included individuals with differentiated expertise in deep Earth and surface Earth geoscience, and it was assembled to examine the conditions in Earth's early history that gave rise to the oxygenation of the Earth's atmosphere, a phenomenon known as the Great Oxygenation Event (GOE). Mark's expertise in this team was as a PWorker who can diagnose and develop applied solutions to team communication problems. As such, his experience mirrors many workplace contexts wherein PWorkers are seen as performing secondary support roles. During his research, Mark invited Chris to work as a sounding board collaborator and help him think through the emerging research findings as he developed a shared language model.² It was in these interactions that the theorizing work introduced in this chapter occurred.

In this chapter, we develop a model of "functional flexibility" and illustrate its use in an organizational context that involves the features of contemporary workplace contexts. First, we establish the groundwork upon which calls for adaptability are built. We then use this background to support our theorizing and building of a functional flexibility model and follow with three vignettes from Mark's work and his reflective memoing (Birks et al., 2008; Razaghi et al., 2020) and sounding board conversations with Chris to illustrate how the model can support adaptability in teaming contexts. We close by discussing the model's implications to PWorkers.

1. Mark's work was supported by the National Science Foundation Frontiers in Earth-System Dynamics program under Grant 1338810 ("The dynamics of earth system oxygenation").

2. The basis for our collaboration stems from previous research we conducted about social media usage in professional writing contexts (see Hannah & Lam, 2017; Lam & Hannah, 2016, 2017). Of particular relevance to this chapter was our research documenting disparate knowledge dissemination practices between practitioners and academics that fostered a disconnect between the two communities (Hannah & Lam, 2016).

■ Adaptability in Professional Writing

Adaptability, in many respects, is the calling card of PWers' workplace abilities. Employers increasingly require it, and successful performance depends on it. The significance of adaptability is most evident in the continuing interest practitioners and scholars have in documenting and predicting the skills and expertise needed to keep pace with continuously evolving workplace demands (Brumberger & Lauer, 2015; Lanier, 2009, 2018; Whiteside, 2003). Implicit in each of these evaluative efforts is an awareness that trying to keep pace will prove insufficient. There always will be an unbridgeable gap between what is deemed important now and what will be deemed important in the future. Working in this gap thus requires a new kind of learning, a kind of adaptable, flexible intelligence or *metis* (Scott, 2008). This new way of thinking guides PWers' decision-making and reconfiguration of existing skills to match new workplace requirements. Through drawing on *metis*, PWers can cultivate the capacity to "learn how to learn" in novel environments and pivot in and between existing and incipient skills, i.e., adapt, in order to perform effectively (Dusenberry et al., 2015; Johnson-Eilola & Selber, 2012; Saily et al., 2011). Ultimately, in calling for the ability to "learn how to learn," PW practitioners and scholars reframe their expertise as emergent (Hannah & Arreguin, 2017; Henry, 1998), which reveals not only that PW expertise is dynamic and unstable (Henry, 1998) but also that the potential value of that expertise is unknowable to themselves and collaborators.

Dynamic yet unknowable expertise has implications for teaming and case-making. As Allen Brizee (2008) argues, the ability to work in teams is paramount, and within teaming contexts, there is a persistent need for PWers to case-make their expertise (Hannah & Arreguin, 2017) and locate themselves as creative, productive problem-solvers (Bekins & Williams, 2006). Doing so successfully helps PWers craft their ethos and an attendant sense of legitimacy amongst team members, which ultimately enables PWers to take on leadership roles and mediate between competing project needs. In these roles, PWers draw on a willingness and ability to engage with inchoate project conditions (see Dusenberry et al., 2015) and identify and name the tacit and explicit communication barriers that limit the team's work. Implicit in all of this work is the adaptability and flexibility that facilitates workplace success.

Across these conversations, it is clear how PWers have come to bear the moniker of "masters of contingent flexibility" (Coppola, 2006), which suggests an always-ready openness and responsiveness to emergent workplace factors. While valuable for a resultant breadth of adaptability in the face of uncertainty, we also see the breadth of contingent flexibility as simultaneously narrowing through its centering of contingency at the individual level, an interior adaptability characterized by questions such as "What must I, the PWer, do to adapt?" "How do I reconfigure my skills and practices to align with emergent work demands?" and "How do I re-describe the nature of my work and its value to team members?"

Though an essential starting point for responding to the unstable conditions of contemporary work, questions like these limit considerations of the value of adaptability to individual workers at the expense of broader, relational processes of adaptability that involve the local, social factors of teaming environments. Examples of relational factors include a team's language use practices, interpretive models, and value systems which underlie and predispose how team members work. Such factors involve various tacit ways of doing work that unintentionally create barriers that constrain the ability to conduct work effectively, efficiently, and economically. Arguing for the centrality of such factors in any articulation of adaptability, we offer our functional flexibility model to give form to the relational practices needed to participate in and shape new forms of work.

■ Introducing Functional Flexibility

As outlined in the literature review, much scholarship has alluded to a somewhat narrow construct of adaptability. Specifically, calls for adaptability are typically at the individual level with the onus to be adaptable on the PWER. Though we agree about the importance of individual adaptability, our model responds to a growing need to build group-level flexibility in teams. And, rather than putting the onus primarily on PWERs, the model suggests ways for all team members to recognize, grow, and foster flexibility. In naming our model, we chose "flexibility" rather than "adaptability" for one key reason. Namely, flexibility acknowledges the inherent value each individual brings to a team, but it also requires each member to bend their ideas, language, and practices to create a new team culture.

PWERs are encouraged to be adaptable in and across workplace contexts; however, little work has defined and delineated necessary skills to foster and maximize adaptability. To work in this space and organize our theorizing about flexibility, we developed the construct of *functional flexibility*, which we define as team members' ability to function effectively, efficiently, and economically within the subcultures of a group, unit, or team. We use the term *subculture* because subcultures have distinct languages, practices, and values. Therefore, we argue that being functionally flexible is more than schooling yourself in a particular content area. Rather, functional flexibility requires deep understanding of workplace subcultures. Our model uses common boundaries faced by cross-boundary work units; however, instead of framing these as boundaries, we present them as opportunities for PWERs to be functionally flexible.

■ Cross-Boundary Teams and Knowledge Diversity

Cross-boundary work is a relatively new academic area of study but has been applied in a variety of industries to spur innovation. Cross-boundary work units are defined as teams that comprise members spanning traditional organizational boundaries. Therefore, cross-boundary teams comprise members that come from

diverse backgrounds. Team diversity has been defined in two primary ways: surface-level diversity and deep-level diversity. Surface-level attributes are “readily detectable” differences like age, gender, race, or ethnicity. In contrast, deep-level attributes involve less visible differences like team members’ knowledge, functional, and educational backgrounds (Harrison et al., 1998). Amy C. Edmondson and Jean-François Harvey (2018) refer to deep-level diversity as “knowledge diversity,” which we also use throughout this chapter.

There are challenges associated with cross-boundary teams with high levels of knowledge diversity. Edmondson and Harvey (2018) divide knowledge diversity into three categories: *separation*, *variety*, and *disparity*. Examples of separation diversity include opinions, beliefs, values, and attitudes. Variety diversity includes content expertise, functional background, network ties, and industry experience. Disparity diversity includes differences in pay, income, prestige, status, authority, and power. The authors argue that these diversity types are “entangled and confounded” in practice (Edmondson & Harvey, 2018, p. 348). Specifically, the authors argue that examining knowledge diversity from a cognitive perspective, where knowledge is reduced to information sharing, does not explain the challenges of truly knowledge diverse teams. That is, if knowledge is solely cognitive, overcoming challenges of knowledge diversity involves sharing information so that all parties have the information. In contrast to a solely cognitive view of knowledge, Edmondson and Harvey (2018) argue for a “practice lens,” which relies on practitioners’ “ongoing and situated actions as they engage with their environment” (p. 348). Further, understanding how cross-boundary teams can thrive depends on what team members “do . . . and not only at the expertise they *possess*.” (Edmondson & Harvey, 2018, p. 348).

If knowledge diversity is contextually bound to practice, what, then, are the unique boundaries that cross-boundary teams face? According to Edmondson and Harvey (2018), they relate these boundaries to “transferring, translating, or transforming” embedded knowledge. The challenges to cross-boundary teams are related to diverse “languages” associated with communities of practice. This work of transferring, translating, and transforming seems perfectly catered toward PWers’ skill sets, yet PWers often find themselves as outsiders in cross-boundary teams, wordsmiths brought in during the final project phases to document knowledge that was created. Therefore, as we develop our functional flexibility framework, we will focus on a deeper, contextual, and more embedded view of developing “shared languages” earlier in a cross-boundary team’s project work.

Borrowing from linguistic categories, Edmondson and Harvey (2018) define three primary boundaries to knowledge diverse teams: *syntactic*, *semantic*, and *pragmatic*. Syntactic boundaries refer specifically to the lexicon differences between team members. For example, product designers may refer to product features very differently than marketing communicators. Syntactic boundaries are relatively thin and easy to overcome compared to semantic or pragmatic

boundaries. Semantic boundaries, which refer to how knowledge is interpreted, call for “common meanings to be developed through shared mutual involvement around problems” (Edmondson & Harvey, 2018, p. 352). Pragmatic boundaries are differences in competing motivations, interests, or agendas, and they exist because individuals from various communities of practice have potentially vast differences in what they deem valuable in the process and outcomes of their workplace team.

Research has shown how these boundaries can positively or negatively impact team outcomes. Teams inhibited by syntactic boundaries, for instance, struggle with communication accuracy and information sharing (Kotlarsky et al., 2015). Groups that struggle with communication accuracy also exhibit higher levels of slacking and lower levels of team performance (Lam, 2015). Additionally, groups with wide pragmatic diversity—i.e., they have widely different interests or values—find team members with competing interests untrustworthy (Williams, 2001). A lack of trust leads to a variety of negative outcomes, including inhibiting knowledge sharing (Andrews & Delahaye, 2000). On the other hand, teams high in trust exhibit greater perceived task performance, team satisfaction, relationship commitment, and lower stress levels (Costa et al., 2001).

A Model of Functional Flexibility for Technical Communicators

Our model (see Figure 6.1) is inspired by the prior literature on cross-boundary teams and knowledge diversity coupled with our observations and contextual experiences as PWers working on cross-boundary teams. The model has three stages and follows a typical theoretical model. We visualize the input with three concentric circles, each representing a barrier as outlined by Edmondson and Harvey (2018). The outer circle represents pragmatic opportunities, the middle circle semantic opportunities, and the inner circle syntactic opportunities. As the visualization suggests, the outermost circle encompasses the two inner circles. If team members develop skills or literacies to address pragmatic opportunities, they also inherently have addressed the two inner rings.

Syntactic opportunities refer to ways team members may develop shared lexicons within cross-boundary teams. As the inner circle of our model, this is a foundational opportunity for PWers to facilitate.

Semantic opportunities refer to ways that team members might develop shared interpretations of knowledge within cross-boundary teams. While there is no one-size-fits-all approach to addressing this opportunity, one way is through developing visual models.

Pragmatic opportunities refer to ways that team members might better understand and appeal to underlying values and motivations within cross-boundary teams.

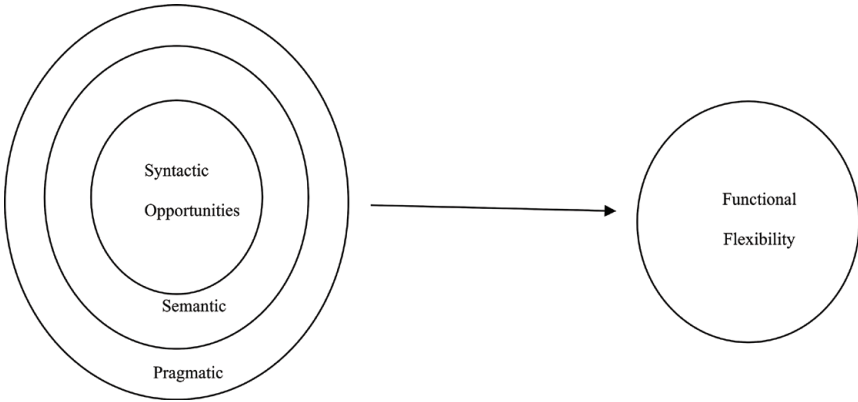


Figure 6.1. *Functional flexibility model.*

■ Vignettes From a Cross-Boundary Organization

To describe the model in fuller detail, we provide vignette examples from diary entries, reflective memoing, and experience reports taken by Mark as a researcher on the GOE cross-boundary team. Mark's sounding board conversations with Chris inform the vignettes. Please note, we include the vignettes only to provide context for our theorizing and not to represent results from an empirical analysis.

■ Example 1: Overcoming Syntactic Boundaries by Developing a Shared Lexicon

An important antecedent to becoming a functionally flexible PWER is the ability to develop a shared lexicon with team stakeholders. Often, in cross-boundary teams where PWERs are not the majority, so-called subject matter experts (SMEs) rarely think it is necessary for the communication expert to share in the SME's lexicon. However, as research has shown, this may inhibit the SME's ability to trust and/or respect the communication expert to complete meaningful work (Lee & Mehlenbacher, 2000). In these cases, it may be up to the communication expert to learn, practice, and integrate a specialized lexicon. This was Mark's experience, as exemplified by his approach to developing a shared lexicon.

Mark's research objective was to build a corpus of the most frequently used oxygen-related terms and then design a survey that asked collaborators to disclose their familiarity with and confidence level in using the terms. Mark wanted to document the wide breadth of understanding between the collaborators about oxygen-related concepts, and it was through visualizing this gap that he hoped to identify the need for shared language development as well as foster a

corresponding commitment amongst team members to do so.³ Providing a detailed account of Mark's research practice for securing this commitment is not possible here; however, there were particularly revealing talk contexts created through his practice wherein we can surmise the operation of syntactic barriers and how they potentially delimited the team's efforts to develop shared language.

One such moment stemmed from Mark's adopting an ethos of naïve outsider at team meetings. Specifically, to fine-tune his understanding of the terminology, Mark frequently asked clarifying questions about the terms being used so he could hear how team members differently defined them, but most importantly, he wanted to hear how they drew connections between terms. For example, when discussing a concept like degassing, what other terms did the team member use in relation to it? How team members responded to Mark's questions offered insight into attitudes about language use. Specifically, the responses showed a willingness to teach. Admittedly, that willingness could be dominated by a desire to communicate to rather than communicate with (Hannah, 2011), but the instinct to teach is important for demonstrating what we characterize as a disposition towards language use, namely team members' default approaches to framing oxygen-related content. Team members responding to Mark's questions might resist being labeled as teachers, but in responding to his questions, they initiated an encounter wherein they assumed an explanatory role and sought to achieve a modicum of identification with him and, indirectly, with other meeting attendees. How these teachers responded to follow-up, clarifying questions was telling about their potential adaptability. For example, if unable to offer relevant, satisfying answers in an initial response, could the teacher reconfigure their approach to language selection and identify terminology more suitable for addressing the questioner's information needs? Often, when researchers performing the teacher role suspected they did not communicate clearly, they would initiate their adaptation by innocuously asking, "Does that make sense?" In moments like these, Mark observed teachers' efforts to develop anchoring points. For example, the teacher might refer back to a comment made earlier in the meeting that had been well understood, e.g., "Remember when we discussed weathering earlier today? Thinking about your question in that light, I would say . . ." Though we are hesitant to infer too much about the adaptive capacities of teachers in such instances, we see grounds for identifying potential allies, i.e., individuals who can move in and between competing knowledge frames through successful translation. The relevance of ally identification to addressing syntactic barriers lies in the constitutive capacity of modeling in team environments. Specifically, after identifying team members who are adept at teasing out language nuance, the PWR can tap those people as models and consistently engage them in meeting settings to generate nascent conditions for others to learn and become teachers themselves. The payoff for modeling here stems from the opportunity to spread the onus for

3. For more detailed descriptions of the survey-building process, see Hannah, 2018 and Hannah & Simeone, 2018.

adaptability throughout the teaming environment. For the PWER, model identification, thus, is a foundational move for activating incipient conditions for cultivating a culture of functional flexibility in which all participants share the onus for securing a commitment to shared language development.

Attendant with the teacher role, Mark witnessed team members engage in what he characterized as play and exploration that signaled a willingness to experiment with language and participate in needed translation work. At team meetings and the on-site interviews Mark conducted to observe language use in a one-on-one research setting, he witnessed various team members let their guard down when speculating about the potential impact of language on their work. This experience of speculative play was clearest with the deep Earth researchers, who were the most skeptical about the usefulness of studying the impact of shared language. Drawing on this sense of play, Mark presented his findings at a team meeting wherein the team confirmed that the corpus accurately represented how the team thought about and used oxygen-related language. Of particular note in the meeting were the arguments team members made regarding inclusion and exclusion criteria about what words would populate the corpus. While some arguments were made forcefully, the most interesting were arguments made in jest, hedged with statements like “this may sound strange . . . which isn’t hard to believe.” In such instances, attendees would offer a quick laugh and smile knowingly while nodding their heads that something unique was about to be expressed. Jest like this example typically encouraged more responses from team members, which gave shape to a considered conversation, as opposed to the halting, fleeting discussions that followed a forceful argument.

In sounding board conversations about the experience of jesting, we recognized a power dynamic at play in these exchanges, not power over, but a power to claim which terminology is most useful and thus valuable to the team. For example, offering up for play a difficult conceptual term like *fugacity* secured a temporary commitment to explore that term. Fugacity, which is a measure of how easily gases permeate into geological substances, is a tricky concept because the deep and surface Earth researchers understood it in conflicting ways—e.g., surface Earth researchers understood fugacity in terms of partial pressure, whereas deep Earth researchers understood it in terms of ideal gas laws—and these differences invited vastly different responses from team members. Through focused conversation about these competing understandings, the term thickened and took on more significance and clarity. Importantly, the thickness became an anchor through which emerging connections between disparate deep and surface Earth ideas about fugacity could be made. Though this claim about thickness may seem obvious, team members who offered challenging terms up for play culled credibility as translational, hybrid deep/surface Earth experts through the clarifying work they performed when new conceptual connections were made. Ultimately, this credibility enabled them to set the agenda for future research meetings and thus shape the team’s continuing work.

As in our previous discussion of ally identification, we are hesitant to infer too much into what motivated the articulation of various inclusion and exclusion

criteria or why a team member framed an argument in a certain way, but we see grounds for understanding the constitutive role of play and its converse, resistance, in team environments, namely how play spurs team members' willingness to let their guard down and think about their language operating in new ways. Resistance and openness are directly linked to addressing syntactic barriers because they can reveal locations for building shared language. It is from those opportunities where team members enact their adaptive practices and respond to team members' communicative needs. As with modeling, identifying these locations is a first step in initiating the spread of responsibility for adapting away from an individual to the shared team environment. Ultimately, it is upon the sharing of responsibility that PWers can secure the team's commitment to drawing from what is shared between their work rather than what divides it.

Example 2: Overcoming Semantic Boundaries by Developing Methodological Literacy

Semantic boundaries can be more difficult to overcome because they rely heavily on understanding how team members interpret and apply information in their contexts of practice. In our model, we suggest that developing methodological literacy is particularly important for PWers in overcoming cross-boundary semantic boundaries. By methodological literacy, we refer to a baseline understanding of the methods and approaches that team members take to interpreting information and solving novel problems within *their own* communities of practice. This involves not only identifying particular methods, but it also requires understanding *how* and *why* particular methods or approaches are selected *over* others and what the end goal of such methods and approaches ultimately is. This methodological literacy gets to the heart of how individuals interpret and apply knowledge within their communities of practice.

Underlying shared language development are relational semantic concerns about competing interpretive practices that shape a team's work. For Mark, this semantic tension appeared most clearly in team discussions regarding the crafting of a knowledge domain for the deep and surface Earth research interests to merge, a middle Earth space. Thinking through this middle Earth space began from a common starting point for all team members, namely their shared commitment to the scientific method. But that shared sense quickly dissipated when they instantiated their individual interpretive practices within the general scientific method. The site of those instantiations was a tried-and-true method in the geoscience community, namely cartoon drawing. This method visualizes relationships between key concepts and offers the opportunity to distill complex information into accessible language for expert and lay audiences. Readers of this collection would understand cartooning as mapping (Sullivan & Porter, 1997), and in team discussions, Mark frequently witnessed members doodle images that demonstrated their understanding of interactions between the Earth's surface

and interior environments. Through sounding board conversations, we recognized doodling as a “think aloud” protocol team members used to share their interpretive perspective and create a space for others to link their thinking. Typically, doodles had a lifespan ranging from a few to twenty minutes, but sometimes a doodle developed a stickiness that kept the figure alive across meetings.

Proposed themes for cartoons included an archipelago, a blind person with their hand on an elephant, and a record player, each suggesting some sense of simultaneous connection/disconnection, and the team settled on the image of a synthesizer (see Figure 6.2) for its ability to visualize how different geological materials and/or processes as inputs (slide bars/knobs) led to different oxygen accumulations in the atmosphere (sounds).

The team members commended the model for how it enabled them to use terms/phrases like turning the inputs up or down. Translated into geoscience terms, the inputs from the Earth’s interior included iron, sulfur, heat, time, etc. and how their combination at different levels led to the output of oxygen (O_2) to the atmosphere. It is beyond the scope of this chapter to discuss the intricacies of how the synthesizer was used to link differentiated understandings of how changed input levels affected O_2 production, but the basic operations of the model lay a foundation for describing how varied interpretive practices manifested in the team’s process of developing and using the synthesizer cartoon. For example, when discussing the role of oxides—e.g., FeO , Fe_2O_3 , MgO , MgO_2 —in redox operations, team members often would default to using one particular form of oxide to frame their understanding of its influence on O_2 production; i.e., a surface member may always start with iron, and a deep member may always start with magnesium.

Of note for the team was the especially high value the deep Earth researchers placed on cartoons. Specifically, because of the inaccessibility of the Earth’s interior (core, mantle, crust), deep Earth research relies on speculative modeling based on estimated control variables across different modeling scenarios. Deep Earth researchers’ model use was a knowledge production practice rather than a tool for synthesizing the team’s findings for dissemination. Of course, deep Earth scientists also rely on cartoons to improve the messaging of their findings, but the difference in principal orientation to cartooning evinced an underlying interpretive knowledge-making practice that operated as a barrier and divided the team’s deep and surface Earth subcultures. Specifically, the different orientations led to distinct ways of framing research findings. Deep Earth framing was speculative but closed, whereas surface Earth framing was explicit yet open, and these framing practices created fundamentally different discourse spaces for collaboration. To a fault, the deep Earth members resisted answering exploratory questions. Instead, they often shifted a discussion by asserting assumptions that were built into a particular model, e.g., “The model’s timing assumptions don’t allow me to answer your question [about the relationship between degassing and magnesium content].” Any follow-up questions also were redirected to those very assumptions, e.g., “Can we revise your question in light of the model’s timing assumptions?”

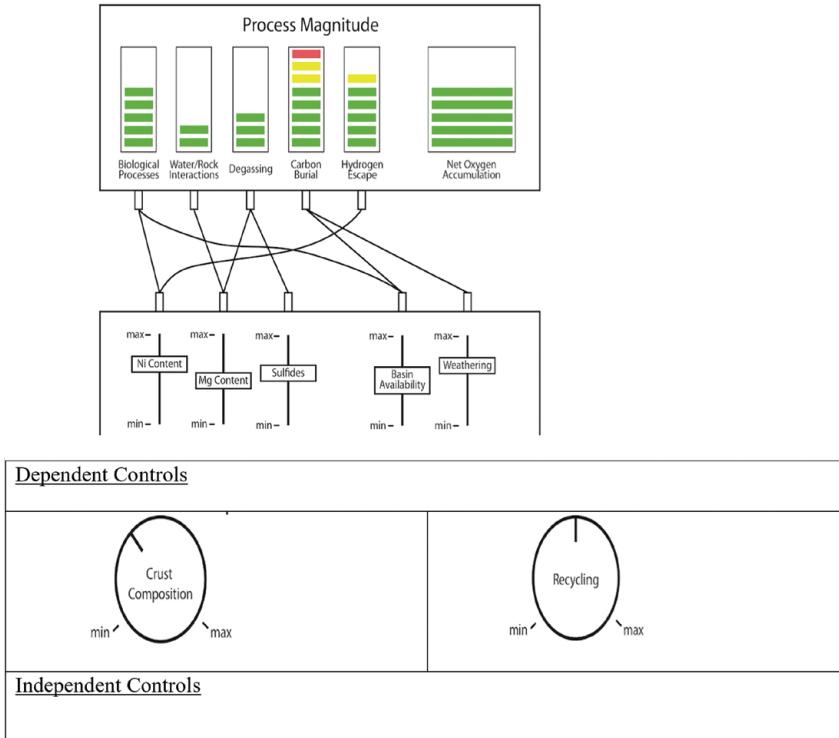


Figure 6.2. GOE synthesizer cartoon.

The surface members’ explicit framing, on the other hand, attempted initially to restrain the team to consider only that which was framed, yet it was dynamically open to expansion. As soon as anyone posed a question in the framing’s context, the surface members invariably would offer a quick response—e.g., “That’s interesting . . . what if we also asked about hydrogen escape? . . . Does this tie back to our question about carbon burial?”—and then move on to what seemed like endless hypothesizing about scenarios they developed when referencing the synthesizer cartoon. Most important, the surface Earth researcher who established the initial framing question willingly participated in the hypothesis exploration—e.g., “That framing changes our approach to carbon burial as an input. What do we see now?” Such willingness in effect certified the interpretive space as open for business and necessary to the synthesis work performed in anticipation of disseminating the team’s findings. In sounding board conversations, we saw the difference in framing as revealing an always already interpretive tension that prefigured a semantic barrier to the deep and surface subteam interactions, a tension that further extended the conceptual distance between the deep and surface subcultures.

From these anecdotes, we identified two conceptual practices as useful lenses for thinking about how to foster a culture of functional flexibility: knowledge orientation and knowledge framing. These practices go hand in hand in invention

work, yet their conceptual separation is important for understanding where and how semantic barriers develop in invention. Knowledge orientation is attitudinal and readily discernible by how one talks about work, i.e., the terminology that shapes the syntactic barrier in our model. Knowledge framing is the follow-up, explicit instantiation of the attitudinal that sets the grounds for work and its desired impact. Being attentive to and informally documenting talk provides PWers a roadmap for alerting themselves to where the major discursive throughways are on the team, where dead ends and detours exist, and most notably, where new knowledge construction is taking place. It is this last example where the syntactic and semantic merge and the need for flexibility arises. Informing any needed flexibility are the insights gleaned from assessing language use—does language and attendant tone signal passiveness and tentativeness or conversely, overconfidence about the team’s work? Does language signal a playfulness or spirit of innovation and willingness to take risks to heighten the impact of the team’s work? We are not suggesting that answers to these questions lead to one-to-one determinations that “this person is (or is not) disposed to conservative approaches to interpretation and knowledge making.” Rather, we are asserting that the syntactic here leads to a surfacing of the semantic. The language, of which an absence of shared usage reveals syntactic barriers, likewise surfaces locales where the always already interpretive tensions between team members pulse the loudest in invention. It is in these reverberations where the work of surfacing pragmatic barriers begins.

Example 3: Overcoming Pragmatic Boundaries by Developing Socioemotional Literacy

Our final example covers the most difficult barrier to overcome in cross-boundary teams—pragmatic boundaries. As described previously, pragmatic boundaries relate to individual and team-based values and motivations, which have significant potential to disrupt team productivity when values are misaligned. While the United States Congress is not a team per se, the lawmaking body of the U.S. government is a clear example of how competing partisan values and motivations stifle cooperation and productivity. On the other hand, when teams align, or even reconcile, values and motivations, pragmatic barriers can become building blocks for a shared vision. When teams work together in the framework of shared vision, they can accomplish deep and meaningful work. So, while pragmatic boundaries are the most significant and difficult to overcome, overcoming such boundaries is most rewarding.

PWers overcoming pragmatic boundaries is unique because the nature of their typical roles in cross-boundary teams is so unique. PWers are rarely the producers of the final subject-matter-specific deliverable. For example, on a cross-boundary team developing a digital product, PWers often are only responsible for developing essential communications about the product for a variety of stakeholders and users. In these instances, there may be a mismatch in values and motivations of, for example, a product engineer and a PWER. The PWER may place a higher emphasis

on the product's end user, while the product engineer may place a higher emphasis on the product itself. But these different emphases rely on much deeper values that are shaped through professionalization, personal experience, and a host of other factors. Product engineers operate under a set of specific ethical guidelines that is developed through experience within the context of a particular discipline. The same is true for PWers. To get to the heart of the differences between values and motivations on teams, we must develop socioemotional literacy and attempt to understand the social and emotional connections between an individual's values and their work/interactions on a team. Developing understanding of someone's emotional and social ties to their work provides further insight and context into other areas of our model, namely methodological frameworks and shared lexicons.

Values abound in work contexts, and as our model intimates, how values operate as barriers stems from how language passes through and/or shapes syntactic and semantic barriers. Values initially shape responses to the *how* and *why* questions that inform and motivate work, but thinking beyond these starting moments requires an ability to identify the persistence of values, namely how and where values continuously shape subsequent collaborative work. For Mark, an example of thinking beyond arose when observing his collaborators discuss how to formalize their work for publication. In those conversations, Mark witnessed the collaborators make arguments about the value and importance of publication venues. For example, questions like the following signaled values orientations about the impact researchers want from their work:

- Do we submit to a more macro journal that has the potential to reach a range of geoscientists?
- Do we submit to a specialized, sub-disciplinary journal that will help us craft the middle Earth research space?
- Do we submit to a popular press outlet to cultivate public understanding about how the world was/is oxygenated?

Central to each of these questions was a concern with audience. Was it attendees at a national or international conference? Readers of a particular journal? Scholars at peer institutions or research teams studying adjacent GOE content? Through sounding board conversations, we came to realize that through the question-asking processes, Mark witnessed the activity of formal practice, specifically, the instantiation of the norms, rules, guidelines, and tacit practices—i.e., the values—that made up and informed his collaborators' professional disciplinary training. Significant to the recognition of formal practice here was how it signaled the ways team members were habituated to work, in particular the doing of work and how they perceived its impact. In recognizing the duality of doing and perceiving, Mark developed a nascent awareness of how values shaped his collaborators' views about what "ought" to be done. More specifically, whenever he heard the word "ought," Mark was cued as to where to look and assess how pragmatic, value-based barriers might surface and delimit the team's work. For example, as the team's project was funded by a National

Science Foundation grant, there were expectations that publications would focus on broad dissemination to geoscience research communities and the public. The surface and deep Earth researchers were clear about this expectation, but at times, they diverged about how to meet it. For instance, the perceived opportunity to craft a middle Earth space was appealing to surface Earth team members to break what in many respects was new ground in their geoscience subfields. Much time was spent discussing whether they ought to pursue the opportunity to innovate through publications that centered interactions between different oxygen-related content—e.g., hydrogen, carbon, iron, and oxygen—or to simply develop publications that traditionally focused on one geological content area—e.g., hydrogen. In contrast, deep Earth team members' conversations about publishing expectations were incrementalist in tone. They hewed closely to their desire to address a specified research gap and not speculate two or three steps down the road about what new research terrain their work might open, i.e., what they ought not do. Ultimately, the preference for incremental impact over transformative impact signaled a difference in values orientations regarding how to address the grant funder's preferences. Now, this is not to say that deep Earth researchers forever eschewed any interest in positioning their work as innovative. Rather, we simply want to direct attention to the oppositional relationality of values orientations in those moments during the grant period when team members preferred different, and at times, competing approaches to achieving the team's overarching goal to develop a unified deep/surface Earth theory that explained how the Earth was oxygenated. The persistence of the pragmatic barrier in this instance played a significant role in what Mark perceived as the deep Earth researchers' diminishing desire to collaborate and publish with their surface Earth colleagues. For example, their presence at weekly in-person research meetings declined in favor of the infrequent team listserv discussions. Opportunities for sustained conversations to tease out the difference in publishing motivations diminished too, thus leaving pragmatic barriers in place.

Attendant with the venue and impact conversations were other attitudes wrapped up in audience analysis, which we again recognized as part of the team members' habitual formal practice. During the grant period, there were publications by a noted researcher who was not a member of the team but was well known by the surface Earth collaborators. In venue selection discussions, these team members frequently referenced the researcher's work and its potential relationship to the team's interest in oxygenation. For the team's deep Earth researchers, there also were notable papers published by outside researchers, yet in venue conversations, those papers were only mentioned in passing. During sounding board conversations, we recognized that the difference in attention to contemporaneous publications revealed conflicting motivations for engaging research peers. More specifically, surface Earth researchers evinced a maximalist tendency towards audience engagement, speculating about how they could interact with research peers not just as readers but as proxies who could spread and amplify their research findings and knowledge to other relevant audiences. Parts of these conversations involved

strategizing about how to frame their findings as a roadmap for outside peers to link up their own findings, an implicit “here’s how to join our work” expression. Notably, the prospect of proxying was not similarly apparent in deep Earth researchers’ discussions. Their interest in noteworthy findings in contemporary publications was limited to “that’s interesting” or “that’s valuable” statements and did not extend to any consideration of how to amplify their findings through the activation of particular peer researchers. Ultimately, we recognized the sustaining tensivity of publishing motivations as an example of pragmatic barrier entrenchment that contributed to the deep Earth researchers’ diminishing interest in co-publishing.

Translating the insights from these anecdotes to the workplace, how might PWers think about formal practice as locales for surfacing pragmatic, values-based barriers that initiate a need to adapt? Habits are the locus of adapting. They arise from formal practice and are what people must move away from—i.e., pivot—when they adapt to emerging workplace demands. Helping others recognize the constitutive force of formal practice is a pathway to spreading the onus of responsibility for adaptability. Specifically, making visible those habituated practices through attending to the disruptions of formal work practices between workers and their decision-making superiors culls awareness about the latent barriers that can stunt a team’s success.

■ Moving Forward with Functional Flexibility

Creating a culture of functional flexibility is not easy. It requires a reorientation to adaptability as not something everyone says you need to do—i.e., an exterior phenomenon—but rather as an acceptance of professional responsibility to distribute and share—i.e., an interior phenomenon. It is not possible to level all the barriers in our model, but we can heighten our awareness of their influence as a provocation to empathize with team members as they work through language use. We can center empathy as a necessary practice for creating conditions needed for spreading the onus of responsibility for adaptability throughout the teaming environment. Our flipping of adaptability as a cultural concern rather than an individual one forges a new pathway for rethinking work and positioning PWers for success in rewriting work rather than being rewritten by it.

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