
# Exploring the Situated and Cultural Aspects of Communication in the Professions: Implications for Teaching, Student Employability, and Equity in Higher Education

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## Abstract

One of the problematic features of the increasingly influential discourse of student employability in higher education is the widespread conception of "skills" as de-contextualized bits of knowledge, ability, and disposition. Instead, how particular competencies are valued, defined, and utilized in practice is deeply shaped by sociocultural, political, and situational factors. The effect of these influences is especially relevant for communication skills, which are widely viewed as critical for employability. In this study we examine how nursing and engineering experts and novices conceptualize communication within specific situations. The data highlight distinct ways respondents define communication and the role of contextual and cultural factors in shaping these perspectives, and how views of "acceptable" communication risk reifying norms of dominant classes while ignoring cultural variability.

Key words: communication, higher education, context, soft skills, employability

# Exploring the Situated and Cultural Aspects of Communication in the Professions: Implications for Teaching, Student Employability, and Equity in Higher Education

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One problematic feature of the influential discourse of student employability in K–12 and higher education is the widespread conception of "skills" as de-contextualized bits of knowledge, ability, and disposition that alone determine a students' success (or failure) in the labor market (Tomlinson, 2012). Such an approach is evident in the lists of skills that college students should acquire to be competitive in the automating and evolving labor market of the 21st century—a narrative that we call the *skills discourse* (Moreau & Leathwood, 2006; Urciuoli, 2008). In particular, institutions and advocates of the skills discourse are focusing on so-called "non-cognitive" or "soft skills"—such as critical thinking, teamwork, and communication—based on evidence that they are desired by employers and linked to academic and workplace success (Heckman & Kautz, 2012; Pellegrino & Hilton, 2012). As a result, researchers, policymakers, and postsecondary educators are focused on integrating these competencies into the college experience via curriculum, instruction, and assessment (Savitz-Romer, Rowan-Kenyon, & Fancsali, 2015).

Discourse on college graduate employability and soft skills emphasizes one competency particularly important—communication. As workplaces become more interdisciplinary, team-based, and cross-cultural, demand for the communication competencies valued by industry and expected in entry-level employees continues to grow (Ananiadou & Claro, 2009; Pellegrino & Hilton, 2012). Employers in a variety of professions, but especially in engineering and health care, where project- and group-based work is more the norm than the exception, seek individuals who can interact with clients and navigate among personnel from different disciplines and in positions (Darling & Dannels, 2003). Consequently, employers view communication skills viewed as an indispensable part of a postsecondary education and a critical aspect of a college graduates' ability to succeed in the workplace.

However, critiques of the skills discourse and their concomitant conceptualization of skills as discrete and generic bits of ability are increasing on conceptual, methodological, and equity-based grounds. First, some view current discussions of skills as being reductionist, treating complex human competencies as simplistic, one-dimensional abilities (Urciuoli, 2008). Communication is a classic case of this reductive turn, where a complex and multimodal activity that involves nuances of language, rhetoric, cultural norms, and communicative scenarios is distilled down to a single term—communication—on lists of employability skills (National Association of Colleges and Employers, 2017). Second, some argue that employers' voices and interests are too dominant, obscuring other parties' perspectives and experiences that are integral to education (e.g., students, educators, employees) while advancing a normative view of what constitutes the "right" skills (Kirchgasler, 2018). Third, the current discourse has been critiqued for treating skills like communication as generic and de-contextualized phenomena while ignoring how communicative norms and practices are embedded within specific sociocultural,

disciplinary, and task-oriented situations (Urciuoli, 2008). Finally, the role of factors such as gender, race, and class in shaping how others perceive and interpret a person's communications is underappreciated, especially with respect to sexism and the dominance of masculine norms of communication (Dow & Condit, 2005; Palczewski, DeFrancisco, & McGeough, in press)

Why do these critiques of the employability discourse and how communication is perceived matter for faculty, staff, and students in higher education? Since postsecondary educators are being asked to teach their students communication skills and other "soft" skills, these future professionals must be taught in ways that avoid superficial templates or formulas, and instead cultivate students' proficiencies with the *communication genres*—or situation-specific communication events that have recognizable structures, characteristics, and goals (e.g., an academic seminar, elevator speeches)—within their fields (Kedrowicz & Taylor, 2013). These genres are best understood, however, not as generic or context-independent modes of communication, but instead as events embedded in specific social, cultural, and political contexts. With robust accounts of the types of situation-specific communication genres and rhetorical strategies that professionals value and use on a regular basis, college and university instructors could design teaching activities and assignments that are authentic and facilitate the transfer of classroom knowledge to real-world contexts (Dannels, Palmerton, & Gaffney, 2017; Martin et al., 2018).

Yet discussions about skills gaps, student employability, and subsequent curricular reforms in higher education fail to engage the topic of communication and pedagogy in ways that involve situational awareness or proficiency in disciplinary communication skills. These discussions tend to overlook two disciplinary traditions that can provide empirical evidence about and rich conceptual tools for understanding communication as an act embedded in the personal, social, situational, and sociocultural milieu in which they are used. Both communication in the disciplines scholars (Dannels, 2001) and discourse analysts working in the sociolinguistic tradition (Gee, 2004) have converged on a theoretical position that oral communication involves the assembly of language and meaning "on the spot," drawing upon individuals' interpretation of the situation, as well as their own unique experiences, identity, and beliefs (Dannels, 2001; Gee, 2004). While communication in the disciplines researchers have studied the oral genres and rhetorical strategies used in fields ranging from health care (Kedrowicz, 2015; Vrchota, 2011) to engineering (Darling & Dannels, 2003), discourse analysts have paid closer attention to documenting the specific features of communicative situations (e.g., material, political, semiotic, and social elements) and how they shape the social interactions among interlocutors and the nature of the communication event (Gee, 2004). The situational factors and the types of rhetorical strategies to which they are associated form what Gee (2004) calls the *situation network*. Discourse analysts have also studied the tacit assumptions and norms that inform how people construct and interpret different forms of communication, focusing on what cognitive anthropologists call *cultural models*, or cognitive schemata that people use to ascribe meaning to particular events, tasks, and situations (Gee, 2004; Quinn, 2005).

In this paper we build upon these traditions by describing the communication strategies that students, faculty, and employers in two high-demand occupations—nursing and petroleum

engineering—consider salient and valuable in their professions, and how these are connected to specific situation networks and informed by underlying cultural models. We analyze interview data from 96 participants using thematic and social network analytic techniques to answer the following questions:

(1) How do students, faculty, and employers in nursing and petroleum engineering conceptualize communication in their professions?

(2) Which situational factors and communication themes are most frequently associated with one another?

(3) What underlying cultural models inform these situated conceptions of communication competencies?

In answering these questions, we demonstrate a new method for cataloging discipline-specific forms of oral communication genres and their corresponding situational and cultural affordances. Furthermore, the data we report in this paper help dispel the myth that "soft" skills such as communication are simple to teach and learn, highlight issues related to gender, pedagogy, and cultural diversity in communication education, and underscore the fact that the skills discourse over-simplifies the complexity of job acquisition and communication itself.

## Background

The current focus on college graduate employability in general, and their communication skills in particular, should be viewed within a broader historical context of higher education's evolving sense of purpose and scholars' perspectives on the skills discourse. In this section we discuss these contexts as well as insights from communication studies, critical discourse analysis, and cognitive anthropology that we bring to bear on these issues.

### Origins and Critiques of the Skills Discourse

Debates about the competencies that college students should acquire has long been part of the postsecondary landscape in the U.S., particularly with respect to professional and vocational education. In recent decades, economic anxieties wrought by recessions and impact of technology on the workplace has led to a renewed focus on ensuring that postsecondary education meets employers' skill needs (Grubb & Lazerson, 2005). As market-based perspectives of education and a view of schooling as primarily an economic act began to grow in influence in the early 1980s, government reports in the U.S., the United Kingdom, and Australia sounded ominous warnings that educational systems failing to provide students with essential workplace skills would hinder economic growth and prosperity (Spring, 2015; Tomlinson, 2012). Coupled with the rising influence of the human capital argument, which posits that investments in education—and the subsequent contribution to individuals' skills and knowledge—ultimately pay off in higher wages and industrial productivity, policymakers increasingly viewed education as both the cause and the solution for a nation's economic problems (Grubb & Lazerson, 2005).

One outcome of this renewed emphasis on workplace skills and vocational education was the rise of the skills discourse and its emphasis on the primary determinant of whether high school

and college graduates found jobs was their possession (or lack thereof) of the correct skills (Holmes, 2013; Moreau & Leathwood, 2006). They must have technical knowledge and ability and "soft" or "non-cognitive" skills such as communication, teamwork, and critical thinking (Farkas, 2003; Pellegrino & Hilton, 2012). While researchers have long found that employers desire applicants with strong non-technical competencies (Carnevale, Gainer, & Meltzer, 1990), recent work in labor economics documenting the apparent long-term impact that such skills have on one's earnings, health status, and level of happiness has raised their profile (Heckman & Kautz, 2012), despite considerable criticism that this line of inquiry ignores structural forces that inhibit social mobility and issues of race, class, and gender (Kirchgasler, 2018). Regardless of these critiques, many discussions of graduate employability focus on how institutions must change curricula, instruction, and assessment to improve how students develop hard and soft skills in college (Savitz-Romer et al., 2015; Wolff & Booth, 2017).

However, scholars have voiced many critiques of the skills discourse on a variety of conceptual, methodological, and philosophical grounds. While many scholars have examined the privatization and economization of schooling in the U.S. (e.g., Ravitch, 2014; Spring, 2015), many of the explicit critiques of the skills discourse in higher education have emerged from Europe and Australia (Moore & Morton, 2017). Here, we review some of these critiques and suggest important implications for conversations about college, skills, and jobs in the U.S.

The first critique is that the skills discourse adopts a simplistic and one-dimensional view of human competency itself. One aspect of this criticism is that competencies such as communication are complex, multimodal, and multifaceted aspects of human behavior that are inadequately captured by the inclusion of a single term—communication—in lists of valued skills. Often produced by industry-related groups (e.g., Morrison et al., 2011) or associations focused on career development (e.g., National Association of Colleges and Employers, 2017), these lists feature a "Top 10" set of generic skills such as problem-solving, communication, leadership, and ability to work in a team. Furthermore, the skills discourse treats skills as distinct, stand-alone "bits" of competency that artificially and inaccurately separate competencies from one another, people's personalities and experiences, and the broader texture of daily life (Urciuoli, 2008). Instead, evidence suggests that both students and employers view skills as "synergistic compilations" of skill and ability (Andrews & Higson, 2008, p. 419), an idea supported by research in cognitive science showing that perceptual inputs are encoded and retrieved via interconnected neural networks (Barsalou, 1999; Brown, Collins, & Duguid, 1989).

Next, some researchers argue that the employability debate and the reliance on skills lists privileges two sets of voices, perspectives, and interests above all others—that of employers and panels of "expert" academics. In both cases, little to no input is elicited from stakeholders such as students, faculty, or career services professionals, who have firsthand experiences with students' transitions to the workforce. Some view this lack of perspective as problematic because the content and characteristics of essential workplace skills likely varies depending on one's role, experiences, and interests (Collett, Hine, & du Plessis, 2015; Tymon, 2013). Some researchers contend the skills discourse advances a normative view of skills based on the perspectives of those in positions of power and influence, while also ignoring (or denigrating) conceptions and

enactments of skills from minoritized groups (Kirchgasler, 2018). Consequently, some scholars instead advocate for interview and other field methods to allow employers, educators, and students to articulate skills needs in their own language and voice, thereby enhancing the ecological validity of resulting data (Andrews & Higson, 2008).

Finally, another critique of employability and skills frameworks is they rely on generic and de-contextualized accounts of competencies. In other words, lists of skills are divorced from the occupational, organizational, and sociocultural contexts in which people cultivate, assign value to, and deploy such competencies (Bridgstock, 2009; Clarke, 2017). This lack of context is problematic when one considers the norms, language, and practices that differentiate disciplinary and professional groups. Joining these groups commits aspirants to complex and time consuming processes of enculturation (Lave & Wenger, 1991; Jackson, 2016). With respect to the competency that is the subject of this paper—communication—this critique of de-contextualization has been extensively addressed in fields that we draw upon for our analysis—that of communication in the disciplines, critical discourse analysis, and cognitive anthropology.

**Focusing on Disciplinary Communication, Situated Discourse, and Cultural Models**

In communication studies, scholars have treated communication as multifaceted and complex phenomena that can take varied forms (e.g., oral, written, digital), occur on multiple levels (e.g., interpersonal, organizational), and exhibit a range of characteristics (Adler, Rodman, & DuPré, 2017). A salient feature for our investigation of situation-specific modes of communication is the notion of a communication genre, or a linguistic and rhetorical convention that is specific to a situation or sociocultural context (Miller, 1984; Swales, 2009). Examples of genres include a Baptist sermon, a sales presentation at a hedge fund, or an academic poster presentation. Communication genres can also be seen as rhetorical strategies with attendant media that are linked to specific situations and purposes, with socially agreed upon conventions developed over time regarding their appropriate usage and interpretations (Berkenkotter & Huckin, 2016). In communicative situations, individuals draw upon a repertoire of situationally appropriate genre knowledge or rhetorical strategies that can be deployed “on the spot” to communicate in understandable and appropriate ways. This tool kit is why communications scholars view communication as a social act involving not only the conveyance of information, but also complex epistemological and cultural knowledge (Dannels, 2001).

To examine discipline-specific features of communication, scholars have examined a variety of fields by focusing on how communicative norms within college courses in business (Cyphert, 2002; Lucas, 2016), design (Dannels, Gaffney, & Martin, 2008), health care and nursing (Kedrowicz, 2015; Vrchota, 2011), and engineering (Dannels, 2002; Darling & Dannels, 2003). In particular, Darling and Dannels (2003) found that engineering faculty viewed communication as a process of translating technical jargon and material for non-specialists (e.g., potential clients), leading the authors to argue that given the prevalence of opportunities for oral presentations within the profession, “engineers probably need a dozen different ways to state and clarify any individual idea or piece of technical information” (p. 13).

Furthermore, Dannels and Gaffney (2009) argue that these disciplinary communities represent complex oral cultures that encompassed communicative norms for situations like technical presentations or client sales pitches, which necessitates students be trained to navigate these complex cultures as well as the social relations embedded within these situations. This view of communication skills as being shaped by cultural and situational factors is in part based on situated cognition theory (Dannels, 2001), which posits that cognition is not solely an "in the head" activity of information processing where context is a mere backdrop, but instead is "distributed—stretched over, not divided among—mind, body, activity and culturally organized settings" (Lave, 1988, p.1). This notion of communication and discourse as a situated, culturally organized, social activity is present in two related lines of inquiry—critical discourse analysis and cognitive anthropology.

Discourse analysis is an interdisciplinary approach to understanding language as a site of power relations, knowledge construction, and identity formation. Discourse analysis grew out of a need to examine language beyond grammar, syntax, and sounds to account for its underlying social, cultural, and political aspects (Fairclough, 2001; Foucault, 2002). In addition, discourse analysis examines how people construct language in specific situations to accomplish tasks or reach goals, with a focus on how language constructs reality while it is being constructed (or constrained) by the nature of the communicative situation itself (Gee & Green, 1998). Thus, one focus of some discourse analysts is the determination of peoples' situated meanings, or how they interpret or make meaning of words or phrases in their actual contexts of use.

Consequently, identifying the salient features of communicative situations, and how they afford or suggest the rhetorical strategies interlocutors select, is an important empirical problem for discourse analysts. Gee (2004, 2005) explores six dimensions of situations or "reality" that work with language to "build and rebuild our worlds" (Gee, 2004, p. 11). Gee's six situational factors are material aspects (i.e., physical space), activities (i.e., meetings, interviews), identities and relationships (i.e., one's role or position within a group), politics (i.e., power and status), connections (i.e., links to previous linguistic interactions), and semiotics (i.e., gestures and symbols). These situational factors interact to provide not only the venue for communicative acts but also the media and material, resulting in what Gee (2004) calls the *situation network* for communication.

When confronted with new situations and configurations of these situational factors—such as a busy hospital emergency room in a large city in Texas—people often don't create original utterances or rhetorical strategies, or derive new situated meanings. Instead, they draw upon their own cognitive storehouses of experiences and memories of appropriate responses for how to act, talk and behave. In doing so, people draw upon what cognitive anthropologists call cultural models, or complex mental representations that encode socially sanctioned and reified beliefs or assumptions about events, issues, and phenomena such as marriage (Strauss & Quinn, 1997), the navigation of battleships (Hutchins, 1995), or how postsecondary faculty approach teaching and learning (Ferrare & Hora, 2014). These models inform how people interpret situations and then select certain forms of communication and/or behaviors that are appropriate to the situation (Gee, 2004).

However, cultural models do not operate like lines of computer code or if-then rules, which when triggered or "run," function in the same manner, no matter the situation. Instead, current models of cognition theorize that networks of neural connections involve myriads of memories, knowledge, and information, which are "activated" in different situations, assembled "on the spot" (Gee, 2004). In addition, situations or environmental cues that are repeatedly encountered, such as a broken hydraulic pump or a lecture hall filled with 300 students, will be perceived as "affording" certain uses or actions that are informed by related networks of cultural models (Greeno, 1994; Norman, 1990). Over time these cultural models "settle" into more stable states, and provide individuals with cognitive storehouses of how to communicate as encounter and interpret different situational factors. In fact, as models become externalized as routinized behavior within social groups and institutions, they become taken-for-granted ways of doing things, such as the traditional doctor-nurse-patient relationship, or what Gee (2004) calls "the lifeblood" of institutions (p. 83). The cultural models that are repeatedly (and at times tacitly) enacted also demarcate what constitutes a "real" member of a community, whether it be an ethnic group or a professional association (Gee, 2004).

A cultural perspective not only sheds light on real differences in how people communicate, but also on how perceptions and interpretations of others' communicative patterns are shaped by issues such as gender. For instance, scholars who analyzed the role of gender in the 2016 presidential election argue that the expectations or cultural norms for "appropriate" communication norms for Donald Trump (i.e., strong, outspoken) and Hillary Clinton (i.e., deferential, submissive) were gendered and were "refracted through expectations tied to the candidate's sex" (Palczewski et al., in press, p. xvii). This perspective entails a shift from thinking solely about how cultural models tied to gender, race, class, or disciplinary affiliation influence how people communicate. Instead, the focus should be on how people's identities and cultural models inform their active construction of meaning and their conveyance of information in social settings and the workplace (McDonald, 2013).

Therefore, in this era where students' soft skills and employability—often discussed and measured in generic and de-contextualized ways—are shaping how colleges and universities function, it is imperative to develop an evidentiary base about how actual (and aspiring) professionals conceptualize and then use communication skills in real-world settings, and how those manifestations vary based on cultural norms and social identities. The methodological challenge facing scholars who aim to contribute empirical research on these topics is to document a group's rhetorical strategies, the situational networks in which they are used, and the cultural models that inform these situation-specific modes of communication.

Our study addressed these points through the analysis of interview and focus group data elicited from individuals who are affiliated with two professions widely considered to be in "high-demand" in the current labor market—nurses and petroleum engineers. Instead of relying on faculty views of communication skills, we included in our sample three distinct groups that represent different interests, workplace contexts, and levels of experience, based on the hypothesis that the rhetorical strategies, situation networks, and cultural models reported by students, faculty, and employers would vary. A variety of methods exist to explore these issues,

including scaling of judged similarities of folk taxonomies (D'Andrade, 1995), inductive analysis of natural language (Darling & Dannels, 2003; Quinn, 2005), consensus modeling (Weller, 2007), and discourse analysis (Gee, 2005), but we combine social network (Ferrare & Hora, 2014; Hora, 2014) and thematic analysis (Miles, Huberman, & Saldaña, 2014) to document the characteristics of and interactions among the rhetorical strategies, situational factors, and cultural models for this group of nursing and engineering students, faculty, and employers.

With insights into how novices and experts in specific professions think about and use situation-specific forms of communication, postsecondary educators can begin to incorporate into their curriculum and instruction distinct examples of these disciplinary habits and norms. While mapping the contours of all communicative situations for a field is neither feasible nor desirable, students should learn to "discern the characteristics of all situations—academic, professional, interpersonal, civic- that they [may] encounter" (Dannels et al., 2017, p. 14). Generating a body of evidence on this point, we hope, will contribute to the repertoire of instructional strategies available to faculty desiring to integrate communication education into their courses, while also problematizing the way that skills, college, and careers are discussed in the academic and public domains.

## Methods

This study is part of a larger mixed-methods research project aimed at exploring how actors within high-demand fields in science, technology, engineering, and mathematics (STEM) in four U.S. cities conceptualized and taught or trained students or employees in four specific skills—communication, teamwork, problem-solving, and self-directed learning. In this paper we focus on data from a single city and a single competency (communication) to discern dominant forms of communication and their situational factors in two occupational groups. Consequently, our research design is a qualitative case study, a method that involves intensive analysis of bounded units of activity that generate rich and detailed accounts of those units (Yin, 2008).

In this instance, the cases are delimited by a single metropolitan statistical area (Houston, Texas), and include 2-year colleges, 4-year universities, and employers working in and with two professions—nursing and petroleum engineering. These sectors were selected due to their prominence in national and regional discussions about in-demand jobs requiring some form of STEM-related disciplinary training. The specific occupations (e.g., petroleum engineers and technicians, and registered nurses) within these sectors were selected due to their being the most populous college-credentialed occupations in the energy and health care sectors in the Houston area (Bureau of Labor Statistics, 2016).

To document how different parties are implicated in the education (and training) of students within these professions, we identified high-enrollment and/or prominent academic programs in the area at the 2- and 4-year institutional levels and employers who recruit from the academic program. Within two 2-year colleges and two 4-year universities, we identified faculty and administrators involved with teaching and/or overseeing core courses in each discipline. These individuals were contacted via email and invited to participate in the study, with 22 educators

and 64 students (who were enrolled in educators' courses) agreeing to participate in the study. Then, using North American Industry Classification System codes representing sub-sectors related to the target occupations, we identified employers in these sectors and recruited 10 hiring managers and workplace trainers. For a description of the total study sample by role, see Table 1.

**Table 1: Study Sample**

| | ***n*** | **%** |
|---|---|---|
| **Total** | **96** | **100** |
| **Employers** | **9** | **9.4** |
| Health care | 4 | 4.2 |
| Energy | 6 | 6.3 |
| **Educators** | **22** | **22.3** |
| *2-year* | *5* | *5.2* |
| Health care | 1 | 1.0 |
| Energy | 4 | 4.2 |
| *4-year* | *17* | *17.7* |
| Health care | 11 | 11.5 |
| Energy | 6 | 6.3 |
| **Students** | **64** | **66.7** |
| *2-year* | *28* | *29.2* |
| Health care | 6 | 6.3 |
| Energy | 22 | 22.9 |
| *4-year* | *36* | *37.5* |
| Health care | 25 | 26.3 |
| Energy | 11 | 11.6 |
| **Gender of respondents by discipline** | | |
| Males in health care | 3 | 6.3 |
| Females in health care | 44 | 93.6 |
| Males in energy | 42 | 85.7 |
| Females in energy | 7 | 14.2 |

Notes: The actual interviews for employers differ from the number of respondents, since some interviewees brought coworkers to participate with them. Thus, five interviews took place with energy employers (six individual respondents), and three interviews with health care employers (four individual respondents).

## Data Collection Procedures

Four researchers spent two weeks in Houston conducting all data collection activities. First, a semi-structured protocol comprised of 11 questions was used to conduct interviews with educators and employers. Each interview lasted approximately 45 minutes and took place in the respondents' office or nearby conference rooms. Questions focused on views on important academic and/or workplace skills, social networks for teaching and training, and instructional methods. The questions most salient to the data reported in this paper include: "Can you please define 'communication' in your own words?" and, "Can you describe a time that you integrated 'communication' into your teaching or training?" Second, a semi-structured protocol with 10

questions was used to conduct focus groups with students enrolled in participating instructors' courses. These groups ranged from one to six students, lasted approximately 45 minutes, and took place in conference rooms at the educational institutions. Salient questions were similar to those included in the educator and employer protocols, and elicited definitions of communication and views on why it is an important skill. Finally, classroom observations were conducted using a structured protocol that includes codes related to teaching strategies and student behaviors that are recorded every 2 minutes, but for this study we focused on ethnographic note-taking regarding how teachers taught and described communication skills in the classroom (Hora & Ferrare, 2014).

**Data Analysis**

Our aim was not to conduct a formal linguistic or discourse analysis of natural language, but an analysis of individuals' utterances using what Gee (2004) calls an "ethnographic perspective," which aims to uncover insiders' meanings and underlying cultural models contained within natural language. We inductively analyzed interview text to code for themes, and we graphed affiliations between these themes using social network analysis techniques.

First, responses to interview questions asking participants to discuss how they define and use communication skills were analyzed using an inductive approach to qualitative data analysis (Bernard, 2011). Through our coding, we developed through *a priori* research interests (e.g., conceptions of communication skills) and emergent themes from the data (Charmaz, 2014). Through multiple group readings of several transcripts, we segmented the data into smaller units. Using the constant comparative method, we then followed an open-coding procedure that involved several cycles of generating analytic memos to document emerging themes, identifying underlying ideas and frames of reference that respondents used to understand, explain, or use communication (Glaser & Strauss, 1967). Analysts were in constant conversation with one another concerning the emerging themes as well as any instances of discrepant evidence or negative cases in order to ensure reliability. After discussing multiple versions of the preliminary code list, analysts settled on 22 themes referring to different ways that respondents had defined and/or discussed communication skills.

The next round of analysis is based on upon Gee and Green's (1998) concept that utterances often contain "clues" about how situational factors influence how people use the contents of their cognitive storehouses of situated meanings to communicate appropriately. Then, analysts re-visited the original data to identify the ways in which speakers' conceptions of communication captured by the 22 themes were bound with and/or linked to the six situational factors that Gee (2004) argues are critical aspects of situational networks (e.g., semiotic, physical, sociocultural). Once again, analysts used an open-coding and analytic memo-ing procedure to identify additional situational factors linked to communication usage and conceptualization. The analysts compared their preliminary findings to Gee's (2004) six factors and ended up with a final set of seven situational factors that best fit the data: politics, semiotics, identities and relationships, situational awareness, intersubjectivity, activities, and sociocultural knowledge. They then subsumed each of the 22 communication themes under the situational factor with which the

theme was most frequently associated. To examine the underlying structure in how respondents discussed communicative competencies in relation to the situation network, analysts next used techniques from social network analysis to develop a participant-by-code matrix in which each cell indicated whether participant *i* spoke about situational factor or communication theme *j* (1) or not (0) in their interviews. Analysts assigned "1" to every code *j* cited in participant *i*'s interview. We then used UCINET software to create affiliation graphs of the situation network to depict how particular nodes are related to one another (Borgatti, Everett, & Freeman, 2002). The two-mode data matrix was transformed into a one-mode (code-by-code) matrix, which resulted in a co-occurrence matrix in which each cell corresponds to the number of instances where code *i* is affiliated with code *j*. Then analysts used the program Netdraw (Borgatti, 2002) to graph the co-occurrences of pairs of codes for each of the respondent sub-groups (e.g., health care students, energy educators). The thickness of the line connecting a pair of codes indicates how frequently respondents reported the two codes together, with thicker lines correspond to stronger co-occurrences (i.e., affiliations). Then, analysts calculated the degree of centrality of each node to measure the frequency with which a particular code connects to other codes within a situation network (Scott, 2017). The size of each code's icon within each graph was then adjusted to reflect each code's size of degree centrality value.

Finally, we identified the cultural models underlying respondents' conception of communicative acts. Researchers examining cultural models have used methodological that strategies include scaling of judged similarities (D'Andrade, 1995), consensus modeling (Weller, 2007), metaphor analysis (Quinn, 2005), and discourse analysis techniques (Gee, 2005). In this paper we draw on the approach outlined by Quinn (2005) where discourse is analyzed to identify recurrent phrases, ideas, or events that reveal how an individual attributed meaning or value to a communicative event. For instance, a respondent's description of communication as involving a "covenant with society to keep people from harm" was interpreted as the respondent viewing communication as synonymous with safety considerations. Besides documenting three recurrent models of communication, the analysis suggested a conceptual process model whereby certain situations triggered different cultural models and then ultimately communicative behaviors. This analysis drew on techniques for developing causal networks and temporally organized if-then models of emergent categories (Miles et al., 2014).

**Study Limitations**

Several limitations should be considered when evaluating the evidence presented in this paper. First, the small and self-selected nature of the sample precludes generalization of results to the larger population of employers and educators in Houston or to broader populations in these sectors, occupations, and disciplines. Second, the analyzed data are self-reported views, which lack independent verification. In real-world situations, respondents may not communicate in exactly the same way that they report in the interviews. Finally, the lack of multiple interviews with respondents requires putting considerable weight on a single interview, which may not be an accurate representation of individuals' views over time.

## Results

In this section we report the following results: first, how respondents in the nursing and petroleum engineering professions conceptualized communication skills, how situational factors were associated with these views of communication, and finally which cultural models informed respondents' construction of meaning with respect to communication competencies.

### RQ1: How do students, faculty, and employers in nursing and petroleum engineering conceptualize communication in their professions?

Before reporting how participants conceptualized communication in their disciplines, we report an unanticipated finding related to the interconnected nature of competency: Communication skills are strongly linked to and even inseparable from other competencies, especially teamwork and problem-solving, participants reported, to the degree that viewing communication as a discrete skill independent from other competencies would be a mistake. As one nursing student said, "Communication is teamwork and problem-solving." For energy educators, communication was tied to these other competencies, largely because "a lot of incidents (e.g., explosions, fires) can be boiled down to miscommunication" across team members during a problem-solving exercise. For one nursing educator, communication was "essentially teamwork," given the need to make sure all members of a patient's care team (e.g., physicians, specialists, nurses) all had to "be on the same page." Thus, for many respondents discussing communication as a discrete, stand-alone "bit" of skill or knowledge made little sense. Instead, communication is part of a complex amalgamation of competencies (Urciuoli, 2008).

Next, we report findings on the specific ways that respondents described and conceptualized communication skills. Here, we provide brief summaries of the different ways that oral communication is conceptualized and described. The analysis focuses on oral communication instead of other forms of communication because respondents overwhelmingly discussed oral forms of communication instead of other modalities such as written, digital, or non-verbal forms. The 22 reported themes reflect recurrent phrases and ideas related to communication reported by four or more individuals within each sub-group (i.e., students, educators, and employers) in Table 2.

**Table 2. Oral Communication Themes Prominent within Nursing, Energy Professions**

| Communication Theme | Frequency | | | | | | | Definition |
|---|---|---|---|---|---|---|---|---|
| | All (n=96) | Health Care Em-ployer (n=4) | Ener-gy Em-ployer (n=6) | Health Care Educa-tor (n=12) | Energy Educa-tor (n=10) | Health Care Stu-dent (n=31) | Energy Stu-dent (n=33) | |
| Understanding | 41 | 2 | 2 | 7 | 6 | 10 | 14 | Ensuring sender and receiver of a message both understand the other |
| Teamwork | 33 | 2 | 3 | 6 | 6 | 10 | 6 | Working in teams, collaboration and/or working with others |

| Communication Theme | Frequency | | | | | | | Definition |
|---|---|---|---|---|---|---|---|---|
| | All (n=96) | Health Care Em-ployer (n=4) | Ener-gy Em-ployer (n=6) | Health Care Educa-tor (n=12) | Energy Educa-tor (n=10) | Health Care Stu-dent (n=31) | Energy Stu-dent (n=33) | |
| Seeing big picture | 29 | 2 | 1 | 5 | 1 | 4 | 1 | Understanding the whole situation, mechanism, or person |
| Translating jargon | 25 | 1 | 2 | 7 | 6 | 4 | 5 | Nomenclature, jargon, dialect, meaning of words |
| Safety | 22 | 1 | 2 | 6 | 3 | 5 | 5 | Prevent unwanted situations, maintain a safe environment |
| Learning/teaching | 16 | 2 | 3 | 4 | 1 | 3 | 3 | Communication to learn or teach; distinct from teaching of communication skills. |
| Listening | 16 | 2 | 2 | 5 | 3 | 4 | 0 | Listening as central to communication |
| Asking questions | 15 | 0 | 1 | 4 | 0 | 6 | 4 | Ability to ask questions to aid communication |
| Standardized terms | 15 | 2 | 1 | 3 | 3 | 3 | 2 | Using uniform and standardized forms of communication |
| Audience | 14 | 1 | 3 | 4 | 3 | 12 | 6 | Participant discussing the importance of audience when communicating |
| Emotional connection | 14 | 2 | 1 | 8 | 0 | 3 | 0 | Developing or having an emotional human connection in their communication |
| Electronic/written | 12 | 0 | 2 | 4 | 4 | 2 | 0 | Written or electronic forms of communication |
| Situation assessment | 9 | 1 | 1 | 5 | 0 | 2 | 0 | Communication to assess a situation |
| Trouble-shooting | 8 | 0 | 1 | 1 | 0 | 1 | 5 | Communication to figure out and/or solve problem |
| Leadership | 7 | 0 | 2 | 1 | 3 | 1 | 0 | Leaders, leadership, and leadership skills connected to communication |
| Responsibility | 7 | 1 | 2 | 3 | 1 | 0 | 0 | Taking responsibility for others through communication |
| Advocacy | 7 | 0 | 0 | 4 | 0 | 2 | 1 | Need to speak up on behalf of others who need representation |
| Nonverbal | 7 | 0 | 3 | 3 | 1 | 3 | 0 | Non-verbal aspects of communication (i.e. body language, touch) |

| Communication Theme | Frequency | | | | | | | Definition |
|---|---|---|---|---|---|---|---|---|
| | All (n=96) | Health Care Em-ployer (n=4) | Ener-gy Em-ployer (n=6) | Health Care Educa-tor (n=12) | Energy Educa-tor (n=10) | Health Care Stu-dent (n=31) | Energy Stu-dent (n=33) | |
| Professionalism | 6 | 0 | 2 | 3 | 1 | 0 | 0 | Communication tailored to professional circumstances |
| Handoff | 5 | 1 | 1 | 1 | 0 | 1 | 1 | Communication during transfer from one shift to another |
| Chain of command | 5 | 0 | 0 | 0 | 0 | 4 | 1 | Collective acknowledgment of job's working hierarchy |
| Conflict resolution | 4 | 0 | 1 | 2 | 0 | 1 | 0 | Communicating to resolve conflict |

In the following section, we describe the 11 most frequently reported themes participating students, educators, and employers used to describe communication skills within their fields.

**Understanding (41 references).** The most frequently reported interpretation of communication was that it entailed the establishment of a common understanding or frame of reference between parties. Some described communication as a process of establishing intersubjective comprehension, using sports and mechanistic metaphors such as "feedback loop," "tennis match," or "input and output systems" that involve communicators externalizing and explaining an internal thought process that is received or comprehended by another person. Respondents also referred to the process of communication being like a bridge or mediating device between one person and another, especially in situations where complicated technical concepts had to be conveyed to non-specialists. Thus, communication becomes a not unproblematic process of translating across distinct cultural worlds or norms of discourse so that a common understanding regarding patient care or job-site conditions can be achieved.

**Teamwork (33 references).** Next, many respondents emphasized that teamwork was an integral feature of communicative acts, given that in both nursing and engineering contexts, workplace tasks involved small groups and teams. As an energy educator observed, the nature of the work is that a single individual rarely is able to do the work alone—"You can't do it by yourself, and sometimes you're going to need help." Educators in both fields observed that, given the team-based nature of work in a hospital or oil rig, it was essential that all parties were "on the same page," which required not only communication skills but also the ability to work well with others, manage conflict, and navigate differences in leadership styles, and account for varied cultural, disciplinary, and educational backgrounds.

**Seeing big picture (29 references).** In both fields, respondents discussed the importance of situational awareness, or "seeing the big picture" of a patient's status or the myriad operations underway on an oil rig. In some cases being aware of the big picture required the ability to "understand the broader perspective" of co-workers representing different firms or disciplines, while in other situations it involved "looking at the whole patient" when conducting a wellness

assessment. Once an employee gained an accurate comprehension of the situation, he or she needed to communicate this understanding to managers or supervisors, co-workers (especially those on the next shift) and in technical reports such as patient charts or workplace logs. In discussing this aspect of communication, several respondents cited the situation, background, assessment, recommendation protocol that facilitates appropriate communication among team members of a "big picture" awareness of a patient's medical history, current symptoms, and treatment plan (Beckett & Kipnis, 2009). Situational awareness is also closely linked to teamwork, which is another important communication theme in the health care workplace.

**Translating jargon (25 references).** Another communication theme study participants discussed was language itself, particularly discipline-specific jargon and technical language. For this communication skill, they see being able to translate technical terms and jargon into "lay terms" and across disciplinary boundaries an important competency in both the nursing and engineering professions. An energy student described translating jargon as "breaking it down Barney style" to non-technicians on a drilling worksite. In addition, respondents spoke of the importance of syntax, with one nursing student sharing that some instructors had emphasized, "certain ways to structure your sentences" in order to not come across as rude or prying. Thus, communication in these fields entailed a process of re-calibrating one's language to match the knowledge and norms of different audiences.

**Safety (22 references).** One communication theme that respondents from both fields reported pertained to safety. In the hospital and oil or gas drilling workplace, the threat of bodily harm and even death was ubiquitous, and one of the ways that professionals in these fields attempted to maintain patient and worker safety was through effective and timely communication. In health care scenarios, using communication to ensure safety translated not only into following procedures to ensure all patient care team members were operating from common understandings, but also the need to speak up when a problem was noticed. As one instructor articulated, "in the medical field a mistake could cost a life, so you need to be able to feel comfortable to speak up." For energy experts, the need for students to develop good communication skills was non-negotiable, since miscommunicated orders, poorly written technical notes, or misunderstandings among team members could lead to "things exploding and people getting hurt."

**Learning/teaching (16 references).** When respondents described communication skills, several discussed the need for people in their fields to be able to teach others about technical subjects, while being willing (and able) to become a student and learn new things. An energy educator spoke of the need for employees, particularly in situations where teams had to present (and defend) ideas to non-specialist executive or potential clients, to "be able to present and communicate conclusions and results in a structured and effective manner." Further, in the inevitable situations where staff are in conflict, an energy employer said managers need to "understand where (everyone's) head is at," which requires taking the time to learn about people's views and experiences in order to mediate workplace disagreements.

**Listening (16 references).** Another communication theme study participants reported pertained to the importance of active listening, or attentiveness to the nature and meaning of

speakers' utterances and indicating comprehension or understanding. For an energy instructor, poor listening skills are tied to the aforementioned issue of safety, where "The guy that doesn't hear clearly has to make sure what valve he [needs] to open—He can't just be guessing." In health care settings as well, experts observed the necessity of careful listening, especially to patients and their families as they describe symptoms, and among patient care team members who are constantly involved in relaying information to one another.

**Asking questions (15 references).** The next theme pertains to the self-awareness to recognize when you don't know how to do something and need to ask for help. Several respondents echoed the sentiment conveyed by following mantra that a nursing instructor reported: "If you don't know it, ask." Closely related is the requirement in both fields to push past any hesitancy or fear about asking questions, due to the high stakes of misinformation and misunderstanding. Asking for help in nursing is also linked with teamwork: nurses do not work in independent silos, and they must be able to get assistance from other nurses, physicians, and other providers. Respondents in the energy sector stressed that asking questions is a critical component of communication, especially for clarifying an instruction and ensuring accurate understanding of a given request. This type of questioning is essential to avoid a disastrous misunderstanding: As one student put it, "you're going to blow the plant up if you don't know what you're doing."

**Standardized terms (15 references).** In both nursing and energy settings, standardized terminology and formats for communication are often essential for effective and safe patient care and/or plant operations. For health care professionals, using standardized medical terminology when verbally communicating with colleagues and when filling out written reports (e.g., situation, background, assessment, recommendation protocol) is critical for ensuring that all members of the patient's care team are in agreement. In energy contexts, where radio is often the only form of communication, an educator emphasized that it was essential to be consistent and precise with language, using terms that had a common understanding across the many different "operators" present at a drilling worksite.

**Audience (14 references).** Related to terminology is the need for communicators to be aware of different audiences. Generally, this theme refers to the ubiquitous nature of workplace teams comprised of people from different disciplines, specialty areas, or firms. This requires the ability to shift tone, terminology, and rhetoric depending on the audience. Consequently, a different form of communication may be appropriate when interacting with patients (health care) or customers (energy). As an energy student observed, each person one meets is sufficiently different that it is necessary to "speak to them differently, you know like a tailored relationship for that person."

**Emotional connection (14 references).** Establishing a human and emotional connection was important to nursing participants. Such a skill is essential for working with patients and their families. As one nursing educator observed, "If you can't relate to people you're pretty much worthless." In health care settings, relating to people involved being able to be present (i.e., mindful) with and for a patient, to convey positive and caring "energy," and to be perceived as a person who can be trusted with personal information and vulnerabilities. As one educator said,

being able to "connect" with patients and families was an indicator of being "a true nurse." For this instructor, who recently had spent time in a hospital with an ailing family member, too many nurses were "more focused on the computer" and unable to form human bonds with her and her mother. Given that 94% of our nursing experts and novices were women, while 86% of the energy respondents were men, these findings highlight the possible influence or role of gender in these findings. The focus on emotion and compassion are a core feature of dominant discourses of femininity in general, and of feminized aspects of the nursing profession in particular (McDonald, 2013).

**RQ2: Which situational factors and communication themes are most frequently associated with one another?**

Next, we examine how these 22 communication themes relate to our seven situational factors. This investigation is grounded in the view that the cultural, material, political and social situations in which communication unfolds give meaning and material to the communicative act.

**Coding of utterances for situational factors.** We first re-analyzed respondent utterances regarding dominant oral genres (as reported above) for evidence of specific situational factors that shaped or otherwise influenced oral communication themes. Given the robust theoretical treatment of how situational factors shape discourse as elaborated by Gee (2004), we drew upon his framework to guide the analytic coding process (see Table 3).

**Table 3: Situational Factors and Oral Communication Themes**

| Situational Factor | Oral Communication Themes |
|---|---|
| Politics | Advocacy, chain of command |
| Semiotics | Standardized terms, electronic/written, non-verbal |
| Identities and relationships | Teamwork, leadership, audience, learning/teaching, conflict resolution |
| Situational awareness | Seeing big picture, situation assessment |
| Intersubjectivity | Listening, emotional connection, understanding, translating jargon, asking questions |
| Sociocultural knowledge | Responsibility, professionalism |
| Activities | Safety, handoff, trouble-shooting |

***Politics.*** This situational factor pertains to power relations and hierarchies within the workplace that respondents described as important influences on how, when, and why staff communicate with one another. In health care, where attending physicians and/or specialists occupy the most influential position, nursing educators spoke of the need for nurses to both respect this hierarchy while being comfortable with challenging physicians and to not "have fear" so they can advocate on the patient's behalf. In the oil and/or gas workplace, a similar situation exists, with employers and educators discussing the need to acknowledge hierarchy (i.e., job-site supervisors and managers) while being willing to challenge authority when necessary.

***Semiotics.*** Aspects of communication that involve symbolic and meaning-making aspects of language (e.g., non-verbal communication, standardized terminology) are reflected in the

situational factor of semiotics. For Gee (2004), this element of communication is central to individuals' modes of conveying meaning. In our data, respondents emphasized the importance of semiotic features in their professions. For nursing educators and employers, nurses needed to pay close attention to non-verbal cues such as "facial grimaces and signs or symptoms of pain" while mastering different media for documenting patient conditions and care (e.g., electronic health records, verbal de-briefing). While some may view these oral, written, and non-verbal activities to be communication *itself*, based on a situated view, they function only in relation to other situational factors and thus should be seen on the same analytic level as other aspects of the context and situation of communication.

***Identities and relationships.*** **S**tudy respondents viewed the presence of other people and the interlocutors' interactions with them as an important feature of communicative situations. The social context included features of workplace staffing organization such as teams, where the patient care or drilling crew team functioned as a critical unit for and about communication. Some of these teams were rather complex, with members in a hospital care team including, "not just nurses but other doctors, physical therapy, respiratory therapy, and families." Within such social groups, respondents discussed conflict resolution and leadership as shaping the contours of how communication unfolded and whether it was effective and/or productive.

***Situational awareness.*** The next factor pertains to the interrelationship between an individual and her/his own understanding of the environment, or what is called situational awareness (Endsley, 1995). How and whether a person grasps what respondents called "the big picture" or the "situation" was viewed as a critical precursor to the communicative act itself. For instance, people in the energy workplace must often necessary quickly evaluate a situation—with of various people, tools, industrial processes, and conditions—and then issue directives or ask questions. For nurses, the ability to "look at the whole patient," which includes not only their physiological symptoms but also how other nurses have evaluated or treated them on the previous shift, was a critical feature of communication.

***Intersubjectivity.*** Intersubjectivity, or the establishment of consensus and mutual understanding among actors in a social interaction or communicative event, is an important idea in fields such as the learning sciences and sociology (e.g., Nathan, Eilam, & Kim, 2007). Our study respondents viewed intersubjectivity as one of the most essential reasons and motivations for communicating, thus highlighting its role as a personal (and group) factor related to communication. In health care settings, intersubjectivity involved asking questions, listening, and creating a common understanding among all parties involved in patient care. On an oil rig, with people from different companies and backgrounds working in a high-stress environment, making certain that "you understand what people are asking and trying to say" was viewed by one energy educator as an essential competency to get the work done and ensure workplace safety.

***Sociocultural knowledge.*** The people involved in a communicative situation not only influence people based on the need to establish intersubjectivity or the nature of social interactions, but also through tacit norms (i.e., sociocultural knowledge) about communication itself (Gee, 2004). Our respondents identified professionalism and responsibility for one another

as the two primary norms. For instance, an energy educator observed that on an oil rig, treating everyone with respect was important, "whether you're an associate engineer with two years of experience or a senior engineer with 30," which served to maintain professional decorum but also clear communication channels and workplace safety.

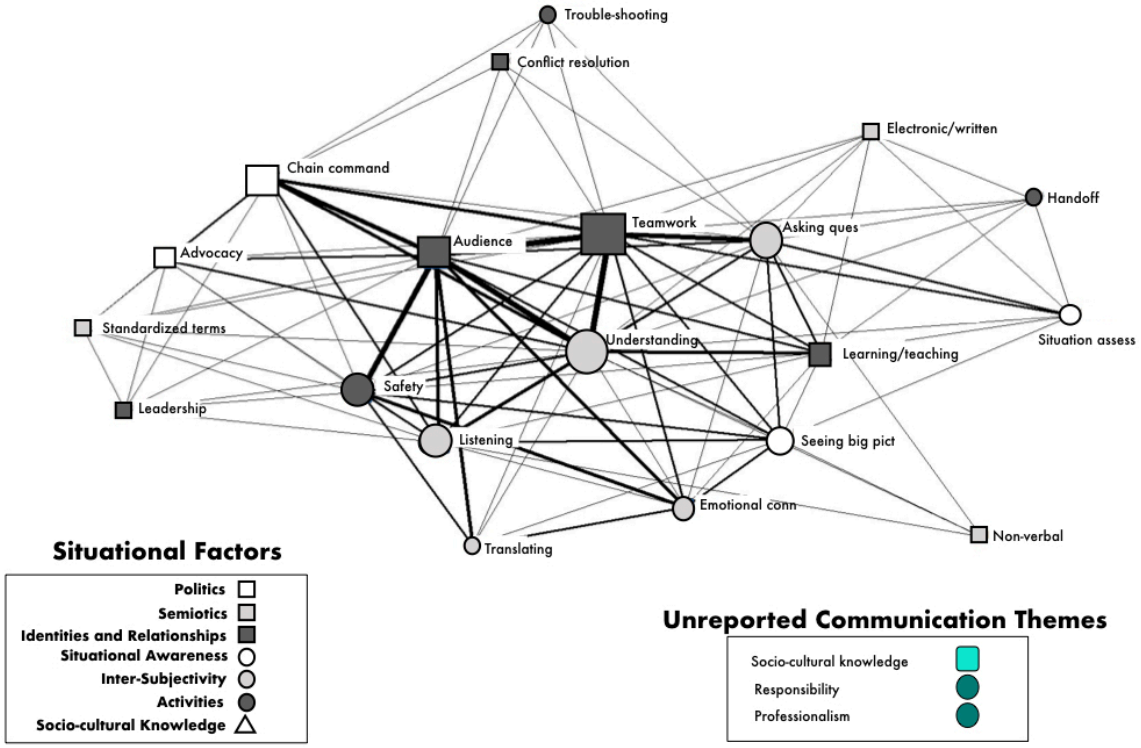
***Activities.*** Finally, a critical aspect of workplace situations or contexts that influences communication is the nature of the task or activity itself. Whether the activity is the "handoff" during a hospital shift change or the need to understand (and confirm) requests like "go out and change valve 101BA" on an oil rig, the specific tools, personnel, abilities, and actions implicated in a workplace task influence the nature of (and the need for) communication between and among team members. This idea is a core component of theories of situated cognition (Brown et al., 1989; Lave, 1988), and our respondents discussed communication not as an abstract "in the head" or de-contextualized activity, but instead as an act whose shape, meaning, and content was dictated by the task at hand.

**Affiliation graphs of communication types and situational factors.** Next, to examine the relationships among these seven situational factors and their attendant themes pertaining to specific forms of communication (e.g., listening, establishing understanding), we generated affiliation graphs using social network analysis techniques that visually depict the situation networks for each group. The resulting graphs show the most frequently reported code-code relations by thick, dark lines connecting pairs of codes, while locating these codes near the center of each image. Less commonly discussed forms of communication (and situational factors) are located on the periphery of each graph, or in the bottom right, which denotes themes that were not mentioned by respondents. The situational factors outlined above are indicated in the graph through different icons (see legend at bottom left in each of Figure 1–6), and the size of each icon is based on its "degree centrality" score that indicates how frequently (or infrequently) a specific code was connected to other codes in the graph (Scott, 2017). In addition to node-specific degree centrality measures, we calculated the overall density of each graph, which is a figure that represents the proportion of actual code-code ties relative to all possible ties. However, these figures are not comparable since the denominator for each graph varies based on different numbers of respondents. We interpret density measures to denote situation networks that are more or less complex and multifaceted.

For a subgroup of respondents (e.g., energy students), these graphs visually represent the locally assembled meanings that individuals construct within a situational network). Thus, the graphs can be viewed as an amalgamation of a group's repertoire of rhetorical strategies and the situations in which group members most frequently express them.

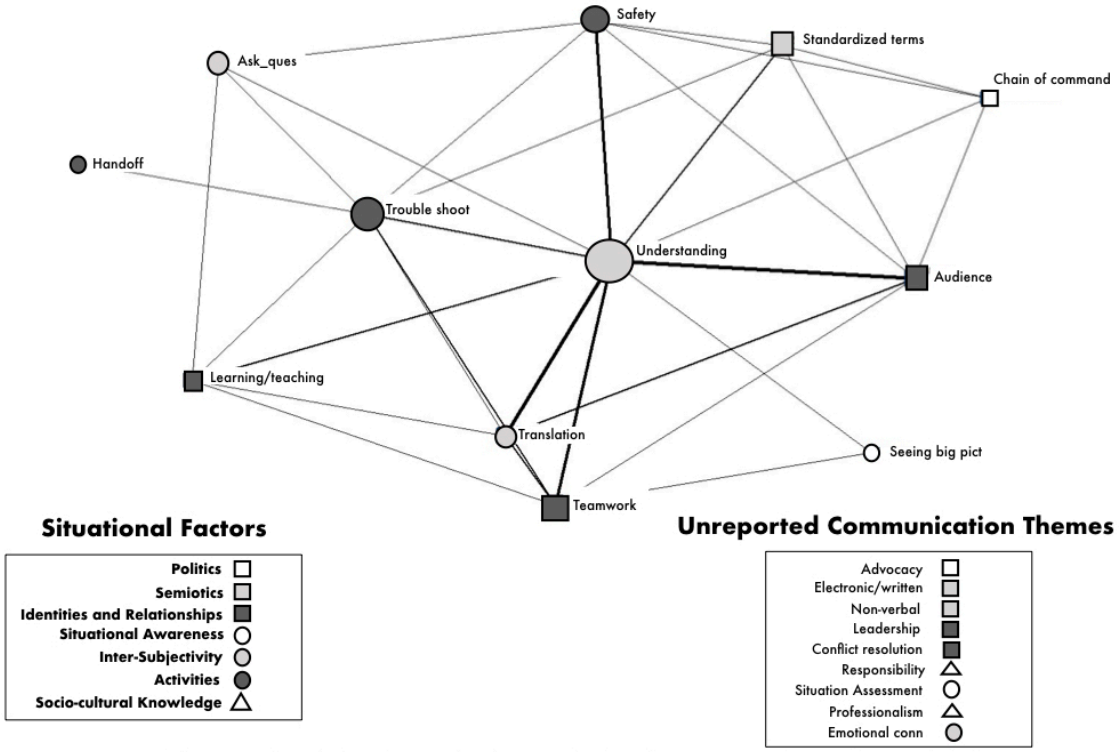
The results indicate that substantial differences do exist among disciplinary and role groups (students, educators, and employers) with respect to the density of their affiliation graphs (i.e., proportion of code-code ties relative to all possible ties) and their situation network. In this section, we consider the affiliation graphs of different pairs of role groups, beginning with students (see Figures 1 and 2).

## Figure 1. Health Care Students




Note: Icon size depicts degree of node centrality (# of links connected to particular code(s))

## Figure 2. Energy Students



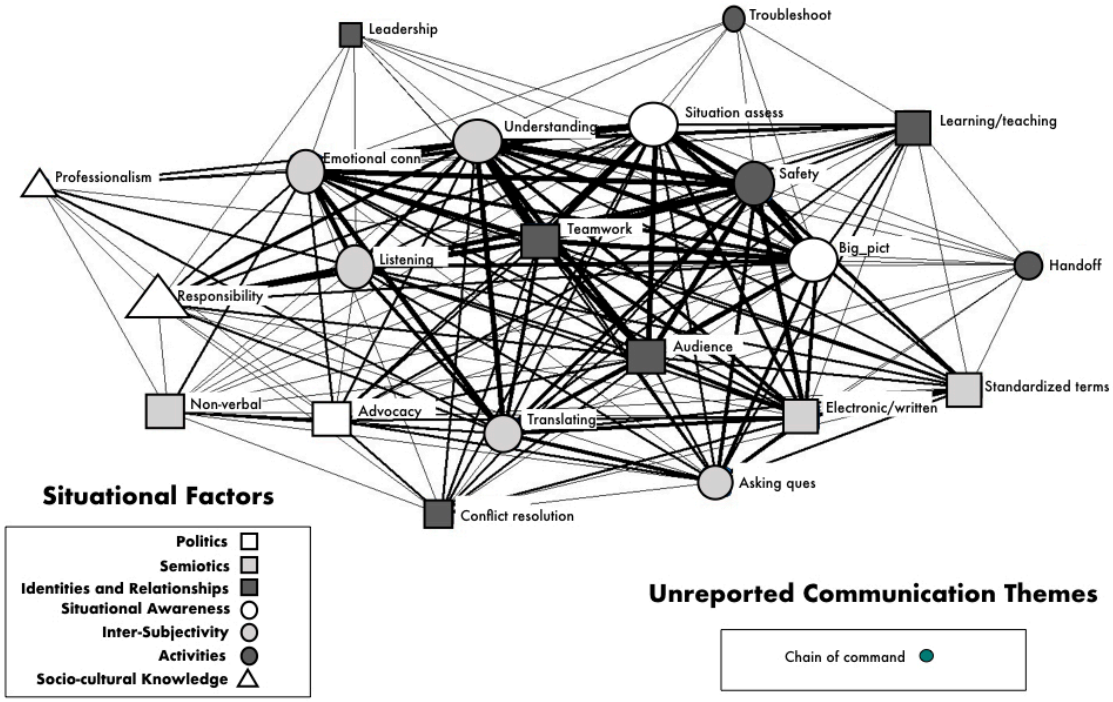

Note: Icon size depicts degree of node centrality (# of links connected to particular code(s))

***Students.*** The situational network for health care students depicts a relatively delimited number of ties between and among communication themes and situational factors (density: 0.119). The themes in Figure 1 with the highest degree measures, indicating how many times a code was linked to other codes, were audience (41), teamwork (36), and understanding (34). Accordingly, the situational factors that make up the situation network for these students include intersubjectivity (i.e., understanding), social interactions (i.e., audience and teamwork), activity (i.e., safety), and power relations (i.e., chain of command). Thus, for health care students communication is primarily an exercise in ensuring that different audiences and team members (e.g., patients, family, and health care professionals) achieve a common understanding about the patient's treatment plan or other information salient to patient care and safety.

In contrast, the situational network for energy students is diffuse and limited, with few nodes and lines. Figure 2 includes a delimited number of codes and code-code ties (density: 0.074), with the most widely reported communication themes being understanding (23), translating jargon (10), trouble-shooting (10), teamwork (10), and audience (10). These forms of communication are linked to the situation factors of intersubjectivity (i.e., understanding, translating jargon), social interactions (i.e., teamwork, audience), and activity (i.e., trouble-shooting). In discussing communication within the field of oil and gas energy, students repeatedly cited the importance of trouble-shooting on the job-site. To fix these problems, these students discussed how it was essential for workers to share a common understanding of the task at hand and to clearly convey problems or developments using written, verbal, and gestural forms of communication. Students linked the need to establish common understandings to the presence of different types of people at a typical job site, representing different companies, disciplines, ethnic and socioeconomic backgrounds, and so on.

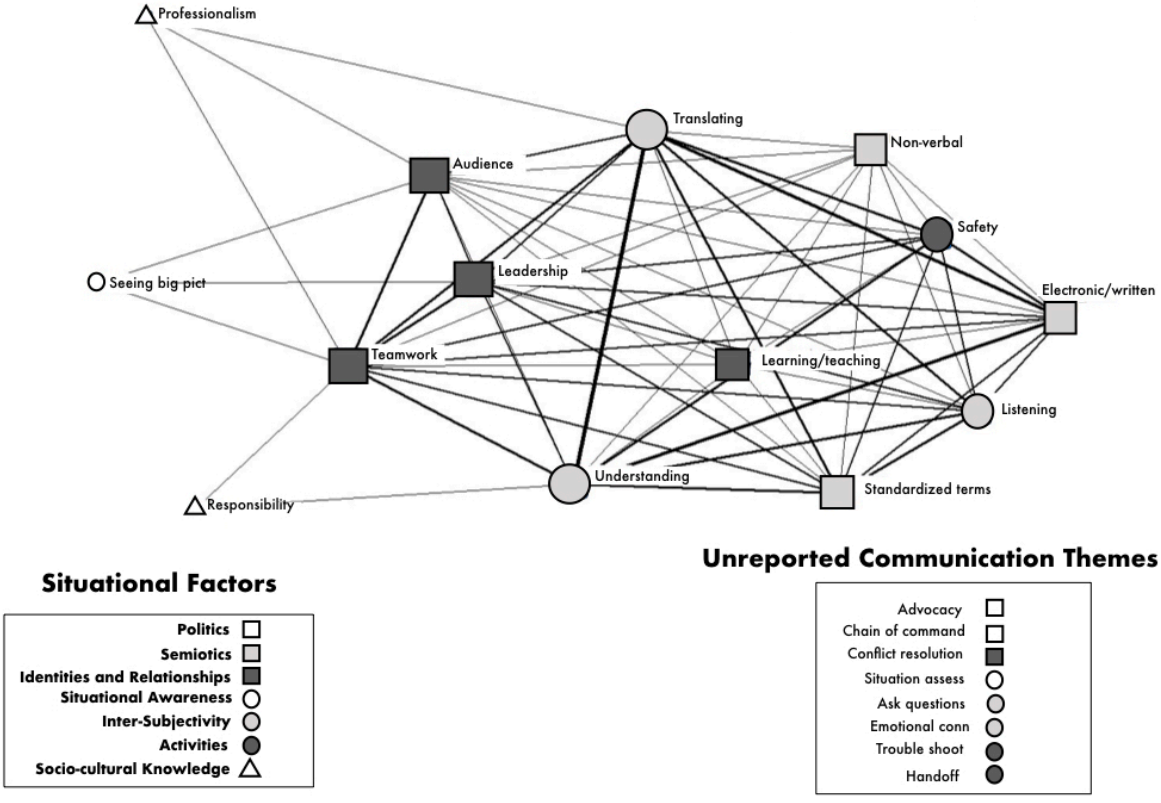
***Faculty.*** Next, we consider the affiliation graphs for faculty in the health care and energy sectors. The health care faculty reported a more complex and dense (density: 0.326) graph (Figure 3) than that of their students, with themes with the highest degree including understanding (58), safety (56), teamwork (55), and situation assessment (49). For this group of faculty, the situational factors related to these communication themes include intersubjectivity (i.e., understanding, emotional connection, translating jargon), situational awareness (i.e., situation assessment, seeing big picture), and social interactions (i.e., teamwork, audience). While the situation network for health care faculty is similar in composition to that of their students, their network is more complicated and involves a broader range of communication types and situational factors. Specific communication themes that educators emphasized that students did not include types of intersubjectivity such as forming emotional connections and translating jargon, plus the entire factor of situation awareness. Similarly, these educators did not emphasize power relations or features of workplace tasks as much as the students. Ultimately, for these educators, communication was seen as a multidimensional competency that involved not only fostering understanding and collaboration among team members and forging intersubjectivity among all parties, but also assessing the big picture regarding a patient's condition and factoring that assessment into what they record in patient's records and convey to their coworkers.

## Figure 3. Health Care Educators




Note: Icon size depicts degree of node centrality (# of links connected to particular code(s))

## Figure 4. Energy Educators

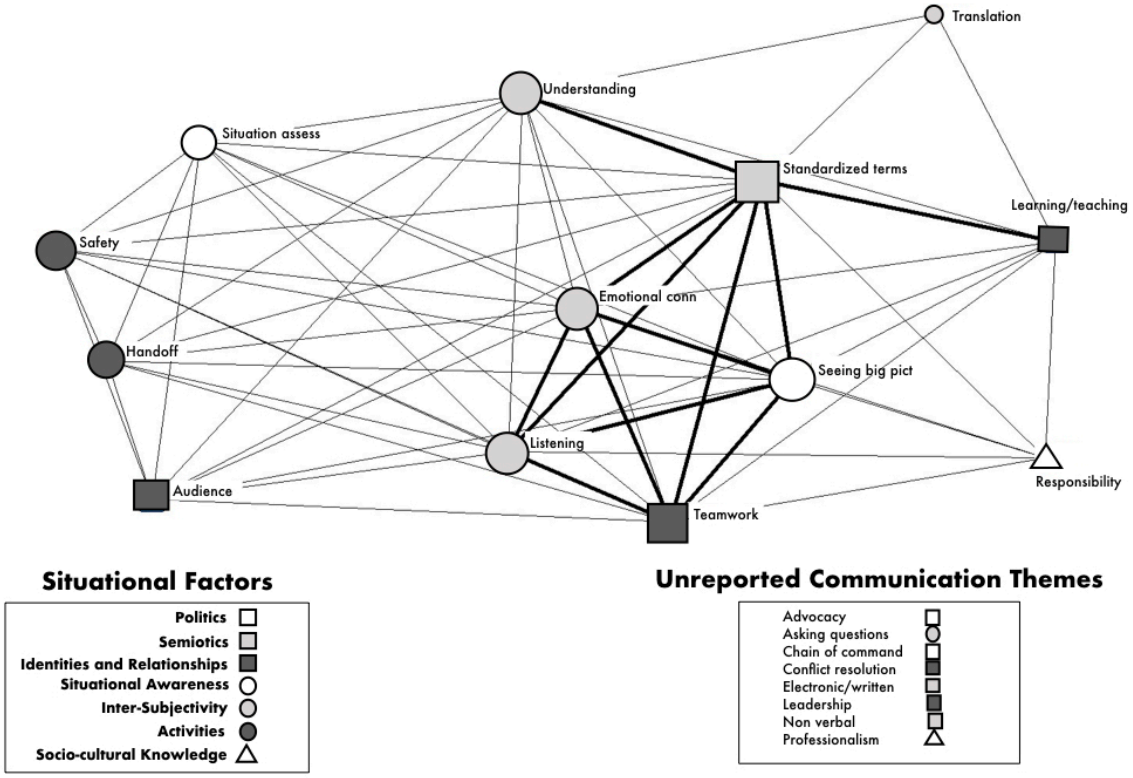



Note: Icon size depicts degree of node centrality (# of links connected to particular code(s))

Figure 4's situational network for educators in the energy sector included a sparse set of themes compared to their counterparts in health care. Energy educators reported communication themes (density: 0.212) that included translating jargon (28), understanding (27), teamwork (25), and electronic/written (22), which then implicated the situational factors of semiotic features (i.e., electronic/written), social interactions (i.e., teamwork), and intersubjectivity (i.e., understanding, translating jargon). For these faculty, knowing how to translate complex technical material to diverse audiences was a critical feature of being a good petroleum engineer. Through digital record-keeping and project management software, paper documents and records, and verbal communication, these educators felt that the future professional would need to master various modes of conveying technical information to diverse teams, a view not unlike those of students in the field.

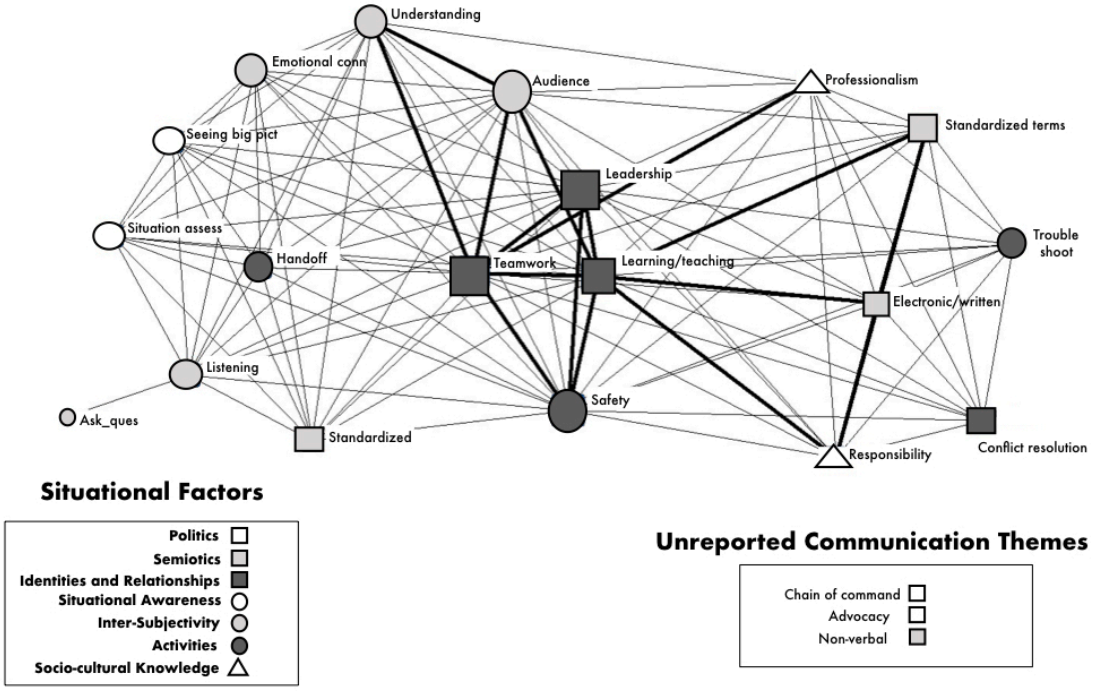
***Employers.*** Finally, the affiliation graphs of employers in health care and energy emphasize slightly different aspects of communication competencies. The situational network for health care employers is characterized by five themes in the center of Figure 5 (density: 0.318). The themes with highest degree scores, which are less frequently cited than in other groups due to the smaller number of employers in the study, include standardized terms (18), teamwork (15), big picture (15), listening (15), and emotional connection (15). These forms of communication are most associated with the situational factors of semiotics (i.e., standardized terms), followed by social interactions (i.e., teamwork), situational awareness (i.e., seeing big picture), and intersubjectivity (i.e., listening, emotional connection). The composition of Figure 6 reflects the importance of health care professionals' use of the situation, background, assessment, recommendation protocol as a workplace communication tool. Obtaining (and conveying) medical information, however, is not a mechanical exercise. It requires careful listening, and ideally an empathetic and sympathetic stance that establishes an emotional connection between provider and patient.

## Figure 5. Health Care Employers




Note: Icon size depicts degree of node centrality (# of links connected to particular code(s))

## Figure 6. Energy Employers



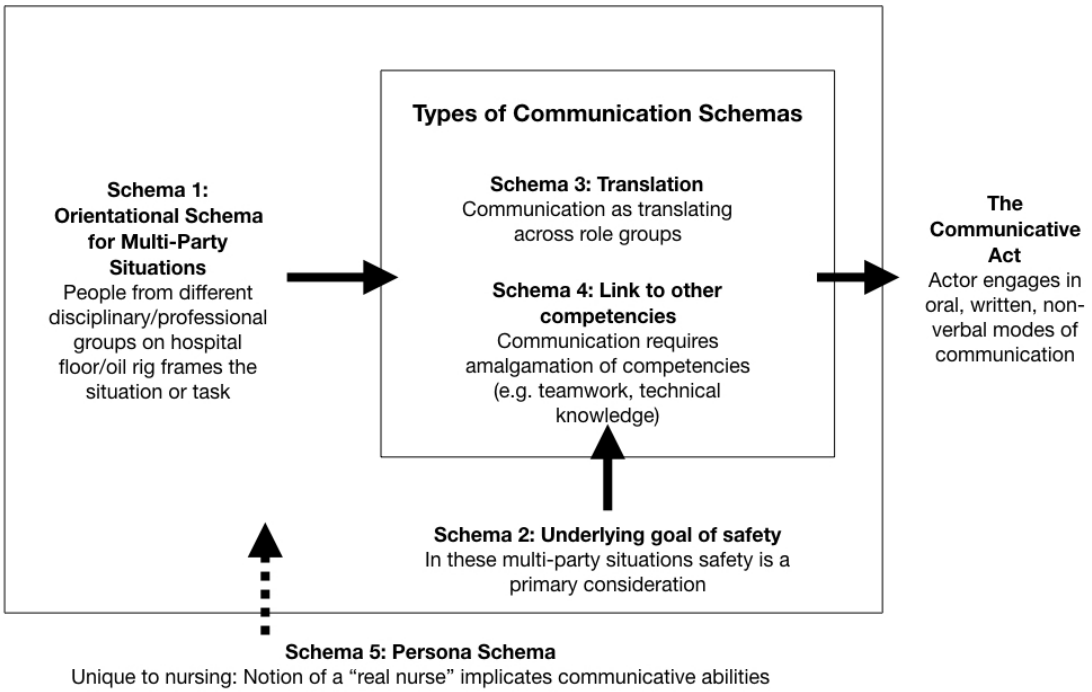

Note: Icon size depicts degree of node centrality (# of links connected to particular code(s))

The situational networks reported by our employers included a combination of themes (density: 0.300) that included learning/ teaching (24), teamwork (23), leadership (20), safety (20), audience (18), and understanding (14). These oral communication themes implicated the situational factors of social interactions (i.e., teamwork, leadership, audience, learning/teaching), activity (i.e., safety), and intersubjectivity (i.e., understanding). For these employers, communication in the workplace entailed conveying complex information to people without similar disciplinary or professional backgrounds, such that is was necessary to "teach" others. Another facet of job-site communication entailed knowing how to be a leader within teams, defusing conflicts between staff, and ensuring that all parties achieved a common understanding of the task or situation at hand. Ultimately, however, these respondents underscored how safety was a primary concern in the field, particularly after recent incidents (e.g., the Deepwater Horizon explosion in 2010) had raised the visibility of communication breakdowns and their relationship to workplace accidents.

### RQ3: What underlying cultural models inform these situated conceptions of communication competencies?

Finally, we sought to identify the cultural models—or socially distributed mental representations—that inform or otherwise underlay how study participants interpreted, understood, and gave meaning to communication in their fields. For this analysis, we sought recurrent phrases and explanations that indicated respondents were assigning meaning to modes or forms of discourse in their fields, which led to the identification of five specific cultural models for communication (Gee, 2004; Quinn, 2005). These models appeared to inform how respondents in both disciplines—health care and engineering—understood the nature of recurrent communicative situations in their fields and appropriate responses (see Figure 7).

**Figure 7. How Cultural Models Affect Communication in Workplace Situations**



**Cultural Model 1: Orientation model for multiparty situations.** The first cultural model pertains to the recognition of situations, such that this model can be considered to be one of perception or activation. The situation being perceived is that of a workplace situation, which appears to be more the norm than the exception in nursing and energy workplaces, that are populated by people from a variety of disciplines or organizations, all of whom must somehow function together. In an energy workplace such as an oil rig there may be people from multiple companies (e.g., those who own the rig, the pumping fluid, and various pieces of equipment), and within each group are different personnel including front-line workers, management, and supervisors. In a health care setting, a nurse may interact with a ward clerk, radiologists, respiratory therapists, chief physician, interns, and so on. Thus, the first cultural model we identified attuned people to the fact that communication-related tasks or issues would necessarily need to deal with multiparty situations.

**Cultural Model 2: Underlying goal of communication is safety.** Next, these multiparty situations are linked to another cultural model that established the underlying frame or constraints of any communicative events—that of ensuring safety. When information about a patient's condition or medications were not communicated among care team members, the patient, and family members, the quality of care (and the patient's life) can be compromised. In energy workplaces ineffective communication can lead to accidents such as explosions or injury. Thus, communication is viewed not as a luxury but as something indistinguishable from safe and professional task performance. This focus on safety, instead of conveying information from one party to another, underscores how communication for our study respondents was no simple matter, but one that involved life and death.

**Cultural Model 3: Communication as an act of translation.** Once the orientation to multiparty situations and its corresponding requirement to focus on safety is established, the next cultural model to come into play pertains to approaching communication as an act of translation. In other words, this model enables the individual to approach communication not with a list of preferable strategies or appropriate behaviors, but instead as a problem of translating the thoughts, experiences, and intentions from one party to another. This conception of communication was also documented by communication in the disciplines scholars examining the field of engineering (Darling & Dannels, 2003), where communicating with non-technical audiences within and external to a firm was considered an essential skill. Here, the finding is similar, but with a broader venue for communication (and subsequent parties) involving not only technical communication but any form of information conveyance among teams as disparate as a patient care team, a patient's family, work groups on an oil rig, and managers from various firms simultaneously trouble-shooting at a job site. In each situation, this cultural model guides the interlocutor to view communication as translation among multiple parties, with the safety and well-being of patients and co-workers at stake.

**Cultural Model 4: Communicative as a competency linked to other skills**. The other cultural model linked to specific approaches to communication pertained to a multifaceted notion of the competency itself. That is, respondents spoke repeatedly of communication in their professions as implicating other competencies such as teamwork and problem-solving, such that

it was nonsensical to separate them from one another. Thus, in situations where multiple parties necessitated a translational approach to communication, other skills were required in ensure information was conveyed. Only when these conceptions of communication were activated and operative for an individual did the individual select and enact a communication mode (e.g., oral, written, non-verbal).

**Cultural Model 5: Discipline-specific notions of communicative identity—a "true" nurse.** Finally, a cultural model unique to the nursing profession was identified, that pertained to the notion of a "true nurse." This idea centered on the view of a true nurse as being one who was proficient at making a human connection with patients and family members, to be mindful and present with the patient, and to have these dispositions influence or even dictate how the professional communicates in the workplace. While this an ideal nurse was also conversant with technical features of health care, they were masters of language, empathy, and the ability to translate technical jargon to most any audience, all in the name of ensuring high-quality patient care. This cultural model of a real professional that is centered on communication competencies is not dissimilar to the idea of a communicative identity (Dannels et al., 2008), wherein a person's mastery of the rhetorical conventions of their field and the appropriate situations in which to use them are inextricably linked to their identity as a member of a given profession. Finally, while gender was not mentioned in relation to the notion of a "true" nurse, the association of characteristics cited in this regard (e.g., compassionate, empathetic) is aligned with dominant views of "appropriate" forms of feminine communication in general (Palczewski et al., in press), and of feminized professions such as nursing in particular (McDonald, 2013).

## Discussion

As colleges and universities are pressured to prepare students with skills that will enhance their employment prospects—"soft" skills such as communication—we argue that postsecondary institutions should approach this skills and employability discourse with caution and skepticism. The data we report in this paper indicates that the primary evidence or rationale driving this narrative, which are lists of generic skills desired by employers, ignores how competencies like communication are in fact complex, multi-faceted, and inextricably tied to recurring professional scenarios, contexts, and cultural norms.

In detailing how specific oral communication themes are tied to situational factors and underlying cultural models for a group of nursing and petroleum engineering students, faculty, and employers, we contribute to the fields of higher education, communication education, and discourse analysis in four ways. First, in cataloging discipline-specific genres, and their contextual and cultural influences, we add to growing evidence on how different disciplinary communities conceptualize and use communication in the field (Dannels, 2001). In so doing, however, we also highlight how characteristics such as gender influence how communication skills are perceived and enacted. Second, we contribute a new set of conceptual tools and analytic techniques for scholars to investigate the relationships among discourse, situations, and their cultural underpinnings (Gee, 2004). Third, the results have implications for how postsecondary faculty can best integrate communication skills into their curricula and teaching

practices that go beyond providing generic tips or "best practices" for communication (Dannels et al., 2017). Finally, our data contribute an empirically grounded critique of the skills discourse, and how the current skills-centered debates implicate diversity, culture, and exclusion.

### Contributions to Communication in the Disciplines Research on Communication in Nursing and Engineering

The topics addressed in this study - how aspiring and established professionals in the nursing and engineering disciplines conceptualize and use communication skills - has been extensively studied by CID scholars as well as researchers of health care and engineering education. Here, we elaborate on a finding reported by Darling and Dannels (2003) about communication in engineering that provides an opportunity to discuss how our findings both confirms prior research while also contributing new insights into how individuals in these professions think about communication as a situated activity. This earlier study highlighted the specific communication genres that engineering faculty considered to be valuable, especially the ability to translate technical jargon for diverse audiences, a finding that echoes the emphasis placed on the rhetorical strategy of "translation" discussed by our own respondents. Dannels (2009) begins to move beyond the idea of "translation" as it relates to simply re-framing or re-wording information by advancing the idea of relational genre knowledge, which emphasizes how specific oral genres are embedded within unique systems of relationships that requires the ability to "maneuver within real and idealized relationships between pertinent genre players, and to navigate potential tensions between these players as they interact within actual and simulated activity systems" (pp. 417-418).

Similarly, our data reveal aspects of the translational aspects of communication that go beyond making technical jargon understandable to laypersons as a skill in itself - that also involves situational awareness of what the particular situation is and who the interlocutors are. First, respondents spoke of the need for professionals to "read" the situation with respect to what was happening, such as the delivery of a grim diagnosis to family members in a hospital corridor, or trouble-shooting a broken pump on an offshore oil rig. The nature of the topic or task itself suggests certain ways of conveying information (e.g., with empathy and/or directness), but recognition of these features alone is not sufficient. Respondents in both fields emphasized that the translation process must be responsive to the nature of the people involved in the task. For instance, on an oil rig or in a hospital there are a variety of personnel involved in the aforementioned tasks that represent different firms, disciplinary and ethnic backgrounds, workplace roles, and positions within the local status hierarchy - each of which may require a different approach to the translation process. For example, while an informal "breaking it down Barney style" may suffice for communications between technicians from different companies on an oil rig, a more careful and professional presentational style may be required when nurses converse with family members of patients in their care. Thus, the act of translation is no simple matter of re-phrasing technical material in a dozen different ways, but also requires situational awareness of the social and political configurations embedded within a given task, problem, or situation (Martin et al., 2018).

Next, the results emphasize the critical nature of intersubjectivity, or the establishment of a common understanding between or among interlocutors. While one may assume that intersubjectivity is a desired (or even necessary) aspect of any communicative act, our respondents vehemently stated that it was essential to *not* assume that mutual comprehension had been achieved. In cases where such an assumption was made, they argued, people could die and equipment could explode—essentially, intersubjectivity was a necessary condition to ensure patient and worker safety in these professions. The importance of intersubjectivity is evident in the widespread use of the situation, background, assessment, recommendation protocol in health care settings, which some researchers have described as a tool to achieve a "shared mental model" (Haig, Sutton, & Whittington, 2006). In some cases, staff carry around laminated cards that delineate how they should use the protocol to document the medical situation, patient's background, their own assessment, and subsequent recommendations—all using standardized terminology and formatting that obviates the need for translating technical jargon and should (theoretically at least) lead to the avoidance of miscommunications and misunderstandings. Similar attempts to standardize documentation about repairs, equipment status, and problems on oil and gas job sites were described by our respondents. Thus, our data highlight the fact that safety is such an overriding consideration in these professions that measures have been taken to formalize communication via documentation procedures so that intersubjectivity is achieved at all costs. Despite the introduction and apparent success of procedures such as the situation, background, assessment, recommendation protocol (De Meester, Verspuy, Monsieurs, & Van Bogaert, 2013), however, the social and political dynamics that underlay many communicative situations introduces an element of risk and underscores the importance of staff also having strong situational awareness and interpersonal skills.

**Insights from a Focus on Disciplinary Situation Networks and Cultural Models**

Next, we turn to results regarding the situation networks and cultural models that study participants reported as part of the oral communication genres in their professions. In further specifying the specific situational or contextual factors associated with features of these oral genres, we drew upon Gee's (2004) framework for de-composing the context in which communicative acts are embedded, and techniques from social network analysis to empirically (and visually) document these relationships. This methodological approach can be used to document the general features of communicative situations for different social, cultural, and disciplinary groups. Such an approach, which avoids the fine-grained mapping of all possible themes at the micro-level as well as the overly general descriptions of situational factors at the macro-level, instead provides a middle ground in terms of granularity and specification. The resulting situation networks not only contribute to the growing literature on discipline-specific communication practices, but also can be used as instructional tools to introduce students to the dominant oral genres and the situations in which they most often arise.

Here, we highlight the most widely reported and central features of oral communication themes and situational factors for each of the six groups in our study. The results indicate that substantial differences do exist among disciplinary and role groups with respect to the density of their affiliation graphs (i.e., proportion of code-code ties relative to all possible ties) and the most

central situational factors and associated communication themes. For instance, students in health care and engineering exhibited much less dense and simpler situation networks than professionals with more experience in their fields (i.e., educators and employers). One interpretation of these results is that the student subgroup—as novices—has less complex mental representations regarding different features of oral genres and related contexts, than the experts—educators and employers. Differences in the complexity of cognitive schemata between experts and novices have been demonstrated in the literature regarding approaches to problem solving (Chi, Feltovich, & Glaser, 1981) and the composition of complex ecological systems (Hmelo-Silver & Pfeffer, 2004), with consensus emerging that experts draw on their ample experience to recognize patterns, situations, and subsequent solutions more quickly than novices (Ericsson, Charness, Feltovich, & Hoffman, 2006).

Other differences among groups are evident in the relative emphasis their members placed on different communication themes within the same situational factor. Energy employers, for instance, place greater emphasis on social interactions (i.e., leadership, teamwork) and activity (i.e., safety) than their health care counterparts, whose most prominently reported situational factors were semiotic features (i.e., standardized terms) and intersubjectivity (i.e., listening, emotional connection). These differences may be explained in the distinct natures of the workplaces for these groups of professionals—oil and gas drilling plants or rigs, and hospitals and clinics—where different forms of communication may be more or less valued. In an energy setting, where safety is paramount and dependent on effective teamwork and coordination, communication themes such as emotional connection or standardized terms may be less important. In a hospital setting, using consistent terminology for medications, diagnoses, and observations is critical for patient well-being, and empathetic communication is valued. That said, one must take into account the identities of those within these workplaces, and how their race, gender, class and personal experiences shape how they conceptualize communication skills.

While differences in the density of respondents' affiliation graphs and the most salient features of oral communication themes are evident, so too are commonalities. Between and among our groups of experts and novices, we see how specific communication themes (e.g., understanding, safety) were valued across all groups, especially in the underlying values and norms—their cultural models—that influenced how they conceptualized and then engaged in communication within their professions. Cultural models included a common recognition that the energy and health care workplaces were populated by people from diverse backgrounds, which necessitated a focus on translation and proficiency in other related skills (e.g., teamwork)—all while ensuring patient and worker safety. These interconnected cultural models, we argue, reflected respondents' professional values and beliefs about the world, which in turn influenced how they interpreted similar features of their workplace contexts and engaged in communication themes.

Cultural models theory is useful with respect to situated notions of communication because it shifts attention from shared cultural beliefs at the macrolevel (e.g., the Japanese culture or engineering culture) to specific cognitive representations at the individual level. This change in theoretic focus means that instead of viewing students as examples of their national (or

disciplinary) cultures, in whom norms and beliefs are assumed to reside, they instead become agentic individuals who may exhibit cultural models from a variety of sources—religious, ethnic, disciplinary, and so on. Based on this view, the cultural aspects of communication become an issue of individuals' responses to situations based on their own configurations of cultural models and identities.

While we reported our data in this paper for six groups of people as defined by discipline and role, it is more accurate to think of the individual educator, employer, and student within each group as an individual whose disciplinary and positional identities are but one of the factors contributing to their communicative norms and practices. With respect to the two occupations in our study, one factor cannot be ignored in this regard—that of gender—with 94% of our nursing respondents identifying as female and 86% of our energy respondents identifying as male. These figures are consistent with national data on gender differences in these fields (Kaiser Family Foundation, 2018; Yoder, 2017), and our nursing respondents' focus on a "true" nurse being a communicator that is emotional, nurturing, and empathetic is consistent with gendered notions of acceptable communication for women in general (Palczewski et al., in press) and for nurses in particular (McDonald, 2013).

This finding underscores the persistence of gendered notions of professional communication, which should raise concerns about the continued stigmatization of the "caring" professions (e.g., K–12 teachers, nurses) and their conflation with low-skilled (and thus low-paying) work (Cohen & Huffman, 2003; McDonald, 2013). However, these concerns should be considered along with the fact that empathetic communication, regardless of its association with gendered notions of communication, are widely viewed as essential to the nursing profession. In addition, some scholars argue that communicative norms within the nursing profession are not solely feminine, nor do nurses (regardless of gender identification) solely identify with a single cultural norm. For instance, research on gender norms in nursing suggest that male and female students recognize that "nursing is an amalgam of characteristics that are culturally constructed as both feminine and masculine," with the latter referring to identities such as one's scientific expertise and physical strength (McDonald, 2013, p. 577).

These considerations suggest that additional research is needed on how aspiring and established professionals within postsecondary contexts perceive the intersection of race, class, and gender characteristics with communicative norms within their field, and if and how they negotiate them in practice. Ultimately, a key issue for postsecondary educators will be to sensitize themselves and their students to the cultural aspects of how language and meaning are constructed, in both exclusionary and inclusionary ways.

## Implications for Higher Education: Active Learning, Situation Awareness, and Cultural Diversity

The implications of our study for higher education are clear—teaching communication skills to college students must go beyond the cursory provision of generic strategies to include more intensive and intentional enculturation into disciplinary oral genres, situations, and cultural norms (Dannels, 2001; Gee, 2004). The dominant approach to using overly narrow skills-list

approaches fails to address the role that discipline-specific norms and practices play in socializing young people into occupational cultures. However, exposing students to important oral communication themes and situation networks alone is insufficient, but they need to be trained in the difficult craft of "reading" situations and selecting appropriate responses. For instance, how health care professionals may discuss patient diagnoses will vary depending on the social dynamics present in a situation (e.g., presence of family members or non-specialists). If students are simply provided with a list of "best practices" for communication, such as speaking clearly or maintaining eye contact, they will not be prepared with the essential skill of diagnosing emergent situations and responding in ways that fit the underlying social, cultural, and activity-related characteristics of the moment (Dannels, 2009; Gee, 2004).

To move the field beyond these limitations, research in this area should continue exploring discipline- and profession-specific oral genres, the situational features in which they are embedded, and the cultural norms informing their enactment. A diverse repertoire of methods are available to researchers, from ethnography to social network analysis, to empirically detail how communication is conceptualized and used in the field. Scholars should pay close attention to the ways that gendered and racialized norms of communication are associated with individual disciplines and/or professions, and what implications such norms may have for introducing non-majority students into these fields. Inquiry should also draw upon theory, evidence, and method from a variety of disciplines such as communication studies, cultural and cognitive anthropology, critical studies, and discourse analysis—the issues implicated in education and professional skills are too complex and multilayered to be adequately studied using one perspective alone.

Finally, postsecondary educators must consider cultural diversity and equity issues when teaching and assessing communication skills. They must be mindful of the ability of dominant classes to determine what is "normal" and desirable behavior for students, and that the skills discourse consequently must be challenged on the grounds that it represents normative expectations for and by the privileged few (Urciuoli, 2008). Given history of suppression of indigenous and minoritized forms of communication by the white majority (e.g., Henze & Davis, 1999), one must consider the inimical implications of dominant forms of communicative norms being promulgated on a diverse student body. Consequently, educators need to create an inclusive learning environment for all students with respect to communication (Dannels et al., 2017). Instructors and administrators in higher education must ensure the skills discourse and conceptions of the "right" skills can reproduce inequality and bias in society. This critical view must be balanced against the recognition that in practice, certain professions (e.g., nurses and petroleum engineers) communicate in particular ways, and students should acquire these profession-specific discourses, while their own norms and traditions for communication are recognized and valued.

## References


Adler, R. B., Rodman, G. R., & DuPré, A. (2017). *Understanding human communication* (13th Ed.). Oxford; New York: Oxford University Press.

Ananiadou, K., & Claro, M. (2009). *21st century skills and competencies for new millennium learners in OECD countries* (OECD Education Working Paper, No. 41). Paris: Organisation for Economic Cooperation and Development Publishing. Retrieved from http://dx.doi.org/10.1787/218525261154

Andrews, J., & Higson, H. (2008). Graduate employability, "soft skills" versus "hard" business knowledge: A European study. *Higher Education in Europe*, *33*(4), 411–422.

Barsalou, L. W. (1999). Perceptions of perceptual symbols. *Behavioral and Brain Sciences*, *22*(4), 637–660.

Beckett, C. D., & Kipnis, G. (2009). Collaborative communication: Integrating SBAR to improve quality/patient safety outcomes. *Journal for Healthcare Quality*, *31*(5), 19–28.

Berkenkotter, C., & Huckin, T. N. (2016). *Genre knowledge in disciplinary communication: Cognition/culture/power*. Abingdon, Oxon : Routledge, Taylor & Francis Group.

Bernard, H. R. (2011). *Research methods in anthropology*. Lanham, MD: Rowman Altamira.

Borgatti, S. P. (2002). Netdraw network visualization [Computer software]. Harvard, MA: Analytic Technologies.

Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). UCINET for windows: Software for social network analysis. Harvard, MA: Analytic Technologies.

Bridgstock, R. (2009). The graduate attributes we've overlooked: Enhancing graduate employability through career management skills. *Higher Education Research & Development, 28*(1), 31-44.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*(1), 32–42.

Bureau of Labor Statistics. (2016, May). Metropolitan and nonmetropolitan area occupational employment and wage estimates [Webpage]. Retrieved from https://www.bls.gov/oes/current/oessrcma.htm

Carnevale, A. P., Gainer, L. J., & Meltzer, A. S. (1990). *Workplace basics: The essential skills employers want*. San Francisco, CA: Jossey-Bass.

Charmaz, K. (2014). *Constructing grounded theory*. Thousand Oaks, CA: Sage.

Chi, M. T., Feltovich, P. J., & Glaser, R. (1981). Categorization and representation of physics problems by experts and novices. *Cognitive Science, 5*(2), 121–152.

Clarke, M. (2017). Rethinking graduate employability: the role of capital, individual attributes and context. *Studies in Higher Education*, 1-15.

Cohen, P. N., & Huffman, M. L. (2003). Individuals, jobs, and labor markets: The devaluation of women's work. *American Sociological Review, 68*(4), 443–457.

Collet, C., Hine, D., & du Plessis, K. (2015). Employability skills: Perspectives from a knowledge-intensive industry. *Education+Training*, *57*(5), 532–559.

Cyphert, D. (2002). Integrating communication across the MBA curriculum. *Business Communication Quarterly, 65*(3), 81–86.

D'Andrade, R. G. (1995). *The development of cognitive anthropology*. New York: Cambridge University Press.

Dannels, D. P. (2009). Features of success in engineering design presentations: A call for relational genre knowledge. *Journal of Business and Technical Communication, 23*(4), 399-427.

Dannels, D. (2002). Communication across the curriculum and in the disciplines: Speaking in engineering. *Communication Education, 51*(3), 254–268.

Dannels, D. P. (2001). Time to speak up: A theoretical framework of situated pedagogy and practice for communication across the curriculum. *Communication Education, 50*(2), 144–158.

Dannels, D. P., Gaffney, A. H., & Martin, K. N. (2008). Beyond content, deeper than delivery: What critique feedback reveals about communication expectations in design education. *International Journal for the Scholarship of Teaching and Learning, 2*(2), article 12.

Dannels, D. P., & Gaffney, A. L. (2009). Communication across the curriculum and in the disciplines: A call for scholarly cross-curricular advocacy. *Communication Education, 58*(1), 124–153.

Dannels, D. P., Palmerton, P. R. & Gaffney, A. L. (2017). *Oral communication in the disciplines: A resource for teacher development and training.* Anderson, SC: Parlor Press.

Darling, A. L., & Dannels, D. P. (2003). Practicing engineers talk about the importance of talk: A report on the role of oral communication in the workplace. *Communication Education, 52*(1), 1–16.

De Meester, K., Verspuy, M., Monsieurs, K. G., & Van Bogaert, P. (2013). SBAR improves nurse–physician communication and reduces unexpected death: A pre and post intervention study. *Resuscitation, 84*(9), 1192–1196.

DiMaggio, P. (1997). Culture and cognition. *Annual Review of Sociology, 23*, 263–287.

Dow, B. J., & Condit, C. M. (2005). The state of the art in feminist scholarship in communication. *Journal of Communication, 55*(3), 448–478.

Endsley, M. R. (1995). Toward a theory of situation awareness in dynamic systems. *Human Factors, 37*(1), 32–64.

Ericsson, K. A., Charness N., Feltovich P., & Hoffman R. R., Eds. (2006). *Cambridge handbook of expertise and expert performance*. Cambridge, UK: Cambridge University Press.

Fairclough, N. (2001). *Language and power.* Harlow, England, New York: Longman.

Farkas, G. (2003). Cognitive skills and noncognitive traits and behaviors in stratification processes. *Annual Review of Sociology, 29*(1), 541–562.

Ferrare, J. J., & Hora, M. T. (2014). Cultural models of teaching and learning in math and science: Exploring the intersections of culture, cognition, and pedagogical situations. *The Journal of Higher Education, 85*(6), 792–825.

Foucault, M. (2002). *Archaeology of knowledge*. London, New York: Routledge.

Gee, J. P. (2004). Discourse analysis: What makes it critical? In R. Rogers (Ed.), *An introduction to critical discourse analysis in education* (pp. 19–50). Mahwah, N.J.: L. Erlbaum Associates.

Gee, J. P. (2005). *An introduction to discourse analysis: Theory and method* (2nd ed.). New York: Routledge.

Gee, J. P., & Green, J. L. (1998). Discourse analysis, learning, and social practice: A methodological study. *Review of Research in Education, 23*(1), 119–169.

Glaser, B. G., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine.

Greeno, J. G. (1994). Gibson's affordances. *Psychological Review, 101*(2), 336–342.

Grubb, W. N., & Lazerson, M. (2005). Vocationalism in higher education: The triumph of the education gospel. *The Journal of Higher Education, 76*(1), 1–25.

Haig, K. M., Sutton, S., & Whittington, J. (2006). SBAR: a shared mental model for improving communication between clinicians. *The Joint Commission Journal on Quality and Patient Safety, 32*(3), 167–175.

Heckman, J. J., & Kautz, T. (2012). Hard evidence on soft skills. *Labour Economics, 19*, 451–464.

Henze, R., & Davis, K. A. (1999). Authenticity and identity: Lessons from indigenous language education. *Anthropology & Education Quarterly, 30*(1), 3–21.

Hmelo-Silver, C. E., & Pfeffer, M. G. (2004). Comparing expert and novice understanding of a complex system from the perspective of structures, behaviors, and functions. *Cognitive Science, 28*(1), 127–138.

Holmes, L. (2013). Competing perspectives on graduate employability: Possession, position or process? *Studies in Higher Education, 38*(4), 538–554.

Hora, M. T. (2014). Exploring faculty beliefs about student learning and their role in instructional decision-making. *The Review of Higher Education, 38*(1), 37–70.

Hora, M. T., & Ferrare, J. J. (2014). Remeasuring postsecondary teaching: How singular categories of instruction obscure the multiple dimensions of classroom practice. *Journal of College Science Teaching, 43*(3), 36–41.

Hutchins, E. (1995). *Cognition in the wild*. Cambridge, MA: MIT press.

Jackson, D. (2016). Re-conceptualising graduate employability: The importance of pre-professional identity. *Higher Education Research & Development, 35*(5), 925–939.

Kaiser Family Foundation. (2018). State health facts [Webpage]. Retrieved from: https://www.kff.org/statedata/

Kedrowicz, A. A. (2015). Clients and veterinarians as partners in problem solving during cancer management: Implications for veterinary education. *Journal of Veterinary Medical Education, 42*(4), 373–381.

Kedrowicz, A. A., & Taylor, J. L. (2013). Engineering communication and the global workplace: Preparing professionals and global citizens. *Connexions: International Professional Communication Journal, 1*(2), 81–105.

Kirchgasler, C. (2018). True grit? Making a scientific object and pedagogical tool. *American Educational Research Journal*, 000283121775224

Lave, J. (1988). *Cognition in practice: Mind, mathematics and culture in everyday practice.* Cambridge, UK: Cambridge University Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

Lucas, K. (2016, January 3). Toward better business communication: Students at the University of Louisville learn to master five essential competencies of business communication. *BizEd*. Retrieved from https://bized.aacsb.edu

Martin, K. N., Gaffney, A. L. H., Leak, A. E., Nelson, J., Cervantes, A. T., Gardner, K. L., Clark, B. L., Zwickl, B. M. (2018). Spewing Nonsense [or not]: Communication competence and socialization in optics and photonics workplaces. *Communication Education, 67*(4), 414-437.

McDonald, J. (2013). Conforming to and resisting dominant gender norms: How male and female nursing studentsdo and undo gender. *Gender, Work & Organization, 20*(5), 561–579.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Thousand Oaks, CA: SAGE Publications.

Miller, C. R. (1984). Genre as social action. *Quarterly Journal of Speech, 70*(2), 151–167.

Moore, T., & Morton, J. (2017). The myth of job readiness? Written communication, employability, and the "skills gap" in higher education. *Studies in Higher Education, 42*(3), 591–609.

Moreau, M-P., & Leathwood, C. (2006). Graduates' employment and the discourse of employability: A critical analysis. *Journal of Education and Work, 19*(4), 305–324.

Morrison, T., Maciejewski, B., Giffi, C., DeRocco, E. S., McNelly, J., & Carrick, G. (2011). *Boiling point? The skills gap in U.S. manufacturing*. Washington, DC: Deloitte & the Manufacturing Institute. Retrieved from http://www.themanufacturinginstitute.org/~/media/A07730B2A798437D98501E798C2E13AA.ashx

Nathan, M. J., Eilam, B., & Kim, S. (2007). To disagree, we must also agree: How intersubjectivity structures and perpetuates discourse in a mathematics classroom. *The Journal of the Learning Sciences*, *16*(4), 523–563.

National Association of Colleges and Employers. (2017). *Job outlook 2018*. Bethlehem, PA.

Norman, D. (1990). *The design of everyday things*. New York, NY: Doubleday Business.

Palczewski, C. H. DeFrancisco, V. P., & McGeough, D. D. (Eds.). (in press). *Gender in communication: A critical introduction* (3rd ed.). Thousand Oaks, CA: Sage.

Pellegrino, J. W., & Hilton, M. L. (Eds.). (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century.* National Research Council; Division of Behavioral and Social Sciences and Education; Board on Testing and Assessment; Board on Science Education; Committee on Defining Deeper Learning and 21st Century Skills. Retrieved from National Academies Press website: https://www.nap.edu/initiative/committee-on-defining-deeper-learning-and-21st-century-skills

Quinn, N. (Ed.). (2005). *Finding culture in talk: A collection of methods*. New York, NY: Palgrave MacMillan.

Ravitch, 2014

Savitz-Romer, M., Rowan-Kenyon, H. T., & Fancsali, C. (2015). Social, emotional, and affective skills for college and career success. *Change: The Magazine of Higher Learning*, *47*(5), 18–27.

Scott, J. (2017). *Social network analysis*. Thousand Oaks, CA: Sage.

Spring, J. (2015). *Economization of education: Human capital, global corporations, skills-based schooling.* New York, NY: Routledge.

Strauss, C., & Quinn, N. (1997). *A cognitive theory of cultural meaning*. Cambridge University Press.

Swales, J. M. (2009). World of genre—metaphors of genre. In C. Bazerman, A. Bonini, D. Figueiredo (Eds.), *Genre in a changing world* (pp. 3-16). Fort Collins, CO: The WAC Clearinghouse and Parlor Press, LLC.

Tomlinson, M. (2012). Graduate employability: A review of conceptual and empirical themes. *Higher Education Policy*, *25*(4), 407–431.

Tymon, A. (2013). The student perspective on employability. *Studies in Higher Education*, *38*(6), 841–856.

Urciuoli, B. (2008). Skills and selves in the new workplace. *American Ethnologist*, *35*(2), 211–228.

Vrchota, D. (2011). Communication in the disciplines: Interpersonal communication in dietetics. *Communication Education*, *60*(2), 210–230.

Weller, S. C. (2007). Cultural consensus theory: Applications and frequently asked questions. *Field Methods*, *19*(4), 339–368.

Wolff, R., & Booth, M. (2017). Bridging the gap: Creating a new approach for assuring 21st century employability skills. *Change: The Magazine of Higher Learning*, *49*(6), 51–54.

Yin, R. (2008). *Case study research: Design and methods* (4th ed.). Sage Publications, Inc.

Yoder, B. L. (2017). *Engineering by the numbers*. American Society for Engineering Education.