8 Stories of Becoming: A Study of Novice Engineers Learning Genres of Their Profession

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INTRODUCTION[1]

The study presented in this chapter was prompted by some conclusions drawn from the research into the university-to-workplace transition that was conducted and published in the 1990s through the early 2000s. Some researchers (e.g., Anson & Forsberg, 1990/2003; Dias & Paré, 2000; Dias, Freedman, Medway, & Paré, 1999; Freedman & Adam, 2000a; Freedman, Adam, & Smart, 1994; Mackinnon, 1993/2003) expressed suspicion of the efficacy of traditional professional communication classrooms and raised questions of the portability of genres taught in such classes (Artemeva, 2005). In a more recent debate, Downs and Wardle (2007), Fogarty (2007), and Kutney (2007) continued to discuss the portability of rhetorical strategies between first-year composition courses and "other writing situations" (Kutney, p. 277), with Kutney "echoing Downs and Wardle's . . . concerns about the lack of research on transfer in writing" (p. 278).

In an attempt to further explore the processes of genre learning and the role of the formal classroom instruction in these processes, I designed a longitudinal study that sought answers to the following research questions: (1) What does it mean to master domain-specific—that is, both academic and professional—genres, and in particular, the genres of engineering? (2) Is it possible to teach domain-specific communication strategies apart from the local contexts in which they occur? (cf. Artemeva, 2005). In order to locate answers to these questions, I relied on a theoretical framework (Artemeva, 2008) that I had developed on the basis of the integration of Rhetorical Genre Studies (RGS), also known as North American genre theory (e.g., Artemeva & Freedman, 2006; Bakhtin, 1986; Devitt, 2004; Miller, 1984/1994; Freedman & Medway, 1994a, 1994b; Schryer, 1993, 2000), Activity Theory (AT) (e.g., Engeström, 1987; Leont'ev, 1981; Vygotsky, 1978, 1981), and situated learning (Lave & Wenger, 1991; Wenger, 1998).

This chapter begins with a discussion of the integrated theoretical framework. Next, it describes the design of an engineering communication course that I developed and taught at a Canadian university. Then, it presents four case studies

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of novice engineers who had taken that course and whom I later observed for several years, following their trajectories in learning genres of engineering. The case studies provide illustrations of the integrated theoretical framework's applications to the study of genre learning by novice professionals. The chapter ends with a discussion of *genre knowledge ingredients* (Artemeva, 2005, in press) that allow novices to become successful in using genres of their profession.

INTEGRATED THEORETICAL FRAMEWORK

In the past fifteen years or so many studies of workplace learning and school-to-work transition have relied on Rhetorical Genre Studies as the theoretical framework (e.g., Coe, Lingard, & Teslenko, 2002; Dias et al., 1999; Dias & Paré, 2000). Within the RGS framework, genre is viewed as typified social action (Miller, 1984/1994). RGS allows researchers to expand the study of genre beyond the exploration of its textual features to the analysis of recurrent social contexts that give rise to and shape genres and, at the same time, are shaped by genres (Bawarshi, 2000, 2003; Freedman & Medway, 1994a, 1994b; Miller, 1984/1994; Smart & Paré, 1994). Thus, RGS serves as a useful theoretical framework for research into genre development, learning, and use. For the purposes of my study I have adopted Schryer's (2000) definition of genre as a constellation "of regulated, improvisational strategies triggered by the interaction between individual socialization . . . and an organization" (p. 450). Particularly important for my study is Schryer's (1993) view of genre as stabilized only for now, flexible, allowing for change, and forming the rhetor's behavior, while the rhetor reconstructs genre.

RGS provides us with a social perspective on how individuals learn and use genres. In order to better flesh out relationships between the individual and the social (cf. Berger & Luckmann, 1967), and between agency and structure (cf. Giddens, 1984; Schryer, 2000; 2002) some researchers have successfully complemented RGS with such social theories of learning as Activity Theory, situated learning, and other theoretical perspectives (e.g., Artemeva & Freedman, 2001; Bazerman & Russell, 2003; Freedman & Adam, 2000b; Freedman & Smart, 1997; Dias et al., 1999; Le Maistre & Paré, 2004; Russell, 1997; Schryer, 2000, 2002, 2005; Winsor, 2001). In this chapter, I rely on a complex theoretical framework that integrates RGS with both AT and situated learning (Artemeva, 2008). This integrated framework allows for a close analysis of the interplay between the individual and the social in the study of genre learning in the process of novices' university-to-work transition. However, before presenting this integrated theoretical perspective for the study of genre learning and use, it is necessary to demonstrate that the theories it is based on *are* compatible and *can* be integrated both philosophically and methodologically.

First of all, I would like to stress the inherent dialogism (e.g., Bakhtin, 1986) of both AT (Engeström, 1987) and the concept of communities of practice (CoP) used in the situated learning perspective (Lave & Wenger, 1991; Wenger, 1998). The so-called "third generation" version of AT (Engeström & Miettinen, 1999) attempts to understand interactions between several activity systems, each of them with multiple perspectives and voices, thus bringing the notion of dialogue to the centre of the analysis of human activity. Lave and Wenger's (1991; Wenger, 1998) view of CoP, where newcomers, working on authentic activities with oldtimers, gradually move towards the full participation state, reflects the dialogic nature of the apprentice-master relationship in the context of an authentic activity. These dialogic features of both theories indicate their strong connection with the RGS notions of dialogue and dialogism as conceived by Bakhtin (1986). Other processes and concepts addressed in RGS, such as the dynamics of genre learning activity during a novice's transition from the classroom to workplace context, genre learning in communities of practice, and the concept of identity can be successfully explored and expanded with the use of AT and situated learning.

When studying a novice's learning trajectory in her learning of domain-specific genres as she moves from the university context into workplace CoPs, it is crucial to understand the processes through which this learning occurs. AT provides us with the lens necessary for such an analysis. Human activity in this model is represented as consisting of mutually dependent and connected levels, with constant mutual transformations taking place at each level and among the levels: level 1 (the highest), *need* and *motive* and the corresponding—often collective—*activity*; level 2 (intermediate), *goal* and the corresponding—collective or individual—*action*; and level 3 (the lowest), *conditions* that are necessary to achieve the goal and the corresponding automatic *operations* (Leont'ev, 1981). AT supplies a view of human activity as always mediated through the mediational means, be it physical tools (e.g., a hammer or a pen) or language and other sign systems (Vygotsky, 1978). These AT premises indicate that the theory can be productively applied to research into genre learning. For example, generally, when university course instructors design specific exercises to provide input to students' learning, they perceive these exercises as connected, sequenced, and forming a coherent series of pedagogical tools. For the instructor, completing such exercises is, most probably, closer to the level of operations: the instructor can do them almost automatically. As the three-level model of human activity suggests, an inexperienced student does not and cannot do these exercises at the operation level. We can compare this student with a novice driver learning to drive a car (cf. Leont'ev's famous example): every "exercise" for her has its own *goal* and becomes an *action* that requires full conscious attention. That is,

an exercise that for the instructor is a mediational artifact for conveying course content, for a student becomes an object.

Another example of the AT application to the study of the university-to-workplace transition was provided by Le Maistre and Paré (2004) who successfully combined RGS and AT in order to develop a model of different activities in which their participants were involved as students in classroom settings and as novice members of a CoP (interns working in the workplace). Le Maistre and Paré suggested that when a student becomes involved in the professional practice, the objects of "the learning activity in the school (the theories, laws, methods, tools, and other artifacts of the profession) become 'mediational means' in the workplace" (p. 45).

To elaborate how individuals learn genres, Legitimate Peripheral Participation (LPP), an analytical perspective on learning in CoP provided by the situated learning perspective (Lave & Wenger, 1991), directs our attention to local situations and participants. In this respect the notion of communities of practice allows researchers to analyze learning "that is most personally transformative" (Wenger, 1998, p. 6). Each community of practice is constituted by distinct intellectual and social conventions. These conventions are shared assumptions about the roles of the audience, the rhetor, and the social purposes for communicating, which makes these conventions remarkably similar to the notion of rhetorical genre.

A discussion of community as one of the central RGS notions would be incomplete without a discussion of the formation of a professional identity in novices entering professional communities of practice. In order to understand the role of the agent, it is important to investigate the notion of identity from the perspective of the proposed theoretical framework. The notion of identity is particularly important for RGS because genre "is largely constitutive of the identities we assume within and in relation to discourse" (Bawarshi, 2000, p. 343). Multiple studies of the development and formation of identities through participation in the systems of genres (e.g., Bazerman, 2002) have demonstrated that social action and identity construction are both mediated through and constituted by genres (Hirsh, as cited in Bawarshi, 2000, p. 343). Genres provide social codes of behavior for both interlocutors—the speaker and the listener, the writer and the reader—involved in a dialogic exchange (Bawarshi, 2000, 2003; Voloshinov, 1930/1983). Particularly important in the recent literature on RGS has been the formation of a professional identity of a novice who moves into the workplace after years of academic and professional training. The development of a professional identity is inextricably linked to participating in the workplace genres and "learning one's professional location in the power relations of institutional life" (Paré, 2002, p. 69). From this perspective, identity formation is linked to socialization into, the resistance to, or subversion by, local genres,

which may occur either without one's conscious involvement or through a critical analysis of the organization.

Working within the framework of situated learning, Lave (1991) and Lave and Wenger (1996) introduced the notion of a *knowledgeably skilled identity*, which, as Smart and Brown (2002) observed, is closely linked to a growing novice's sense of professional competence. Learning to communicate in a particular professional situation is part of becoming a legitimate member of a CoP. As Dias et al. (1999) and Smart and Brown noted, learning to become an accepted and functioning member of a particular workplace situation does not involve a simple transfer of knowledge and skills acquired in an academic setting directly to a professional setting. Smart and Brown commented that a growing sense of a novice as a competent professional, that is, the development of her professional identity, contributes to her ability to act as an expert and enhances her capacity to learn in the workplace.

The integrated theoretical perspective based on the combination of AT, the situated learning perspective, and RGS allowed me to analyze both social and individual aspects of genre learning within activity systems and communities of practice. In addition, in my analysis of novices' learning trajectories, I used the concepts of *kairos* (2005) as the right timing and proportion, and *kairotic* opportunities (see Consigny, 1974; Kinneavy, 1986; Miller, 1992) as both "emerging from the communicative activities of . . . rhetors and audiences . . . in specific situations (e.g., institutional context, task, place, and chronological time)" and "enacted, arising when socially situated rhetors choose and/or craft an opportune time to interact with a particular audience in a particular way within particular circumstances" (Yates & Orlikowski, 2002, p. 108).

At the same time, Bourdieu's theory of social practice (1972) provided me with the notions of agency and social capital, in particular, cultural capital as a form of culturally authorized values (Artemeva, 2005). Bourdieu's theory has been recently used by rhetorical genre researchers (e.g., Dias et al., 1999; Paré, 2002; Schryer, 2000, 2002, 2003; Winsor, 2003) to complement RGS and illuminate the role of social agents and texts within organizations which, according to Giddens (1984), represent complex social structures. As Winsor (2003) explained, for Bourdieu, capital exists in different forms that are not necessarily "reducible to money" (p. 17). Bourdieu's capital may take both material and non-material forms that can be converted into each other (e.g., monetary capital may be used to pay for, or be converted into, education, and vice versa). Among other forms of capital, Bourdieu introduced social capital (e.g., hierarchical positions within an organization) and cultural capital (i.e., particular cultural knowledge, such as engineering knowledge, or competency, such as professional engineering competency).

Cultural capital is the key form of capital in Bourdieu's theory. It is defined as "a form of values associated with culturally authorized tastes, consumption patterns, attributes, skills and awards" (Webb, Schirato, & Danaher, 2002, p. x) and, thus, includes, for example, the ways people communicate within particular situations or, in other words, use certain genres (e.g., engineering genres). People can acquire cultural capital without a conscious effort, from their family or social contexts (e.g., school, workplace apprenticeships); they then possess such capital for life. In Bourdieu's view, we would be wrong to think that by deliberately learning components of relevant cultural capital, a person who was brought up in a family with limited relevant cultural capital could acquire as much of it as a person brought up in a family with rich relevant cultural capital. People's appropriation of this type of capital depends both on the sum of cultural capital that their family possesses and on when, how, and in what forms this capital is implicitly transmitted to them from their family and surroundings. Cultural capital can be converted into social capital: for example, a person's education and background in a particular discipline can lead to, or be converted into, her higher position within an organization.

In discussing various other notions integral to Bourdieu's theory, Bourdieu and Wacquant (1992) observed that an adequate theory of social practice requires a theory of social agents. Human agents and the notion of agency, defined as humans' capacity for freedom of action, understanding, and control of their own behavior (Holland, Lahicote, Skinner, & Cain, 1998; Schryer, 2002; Webb, Schirato, & Danaher, 2002), thus play particularly important roles in Bourdieu's theory. As Archer (2002) puts it, we need to conceptualize human agents as being both formed by their "sociality" (p. 11) and able to effect a change in society (Artemeva, 2005).

The concepts of *kairos* and the notion of agency are directly linked. If we see *kairos* as objectively given and then discovered, and as constructed by humans, then the rhetor's ability to select and/or create an opportune moment and act proportionally implies agency. Bourdieu's (1972) theory of social practice provides insights into the acquisition and effect of cultural capital and the role of agency that are invaluable for analyzing an individual's rhetorical behavior within the context of the chosen discipline or profession.

THE FOUNDATIONS OF THE ENGINEERING COMMUNICATION COURSE DESIGN

The engineering communication course (ECC) that I designed and taught (see Artemeva, 2005; Artemeva, Logie, & St-Martin, 1999) served as the starting point for my study. The theoretical foundations of the course design were provided by RGS and the situated learning perspective. In other words, in the

ECC design I attempted to establish an engineering context that would allow students immersed in it to (a) experience genres of engineering communication as an integral part of any project rather than learn *about* genres and (b) be introduced to the idea of genre flexibility that depends on the requirements of a particular situation.

The ECC unfolds around a student project on a topic that each student—or a small student group—chooses from an engineering course(s) that each student is taking concurrently with the ECC. The project may involve conducting a small-scale research study on the chosen topic; performing a laboratory experiment and discussing it on the basis of relevant theoretical literature; designing (and sometimes building) an engineering device and providing a discussion of the theoretical engineering concepts on which the design is based, and so on. I ask students to select topics from their engineering courses according to their interests, and then individually discuss each topic with the student, or a small group of students working on the same project. The project is designed to allow the students to experience the communication course as situated within the engineering curriculum, thus not only allowing students to familiarize themselves with engineering genres but also facilitating their learning in engineering courses. Students are asked to provide a series of project documents as they are progressing in their work: a statement of intent, progress report, oral progress report, completion report, and others. The genres relevant to engineering projects are discussed in class, but it is expected that the task of adapting them to the individual projects will be completed by the students. Every project document/assignment in the sequence is based on and connected to the previous assignment. Students receive both peer and instructor feedback on drafts of each written assignment. All course assignments and feedback received from peers and the instructor form the ECC project genre system (Bazerman, 1994). The project gradually unfolds over the term.

The aim of the project design is to provide students with the opportunity to develop a genuine motivation to adapt the genres they are learning in the ECC for the purposes of their projects, thus experiencing the need to use genres in order to appropriately respond to a particular rhetorical situation. Students experience genres as regulated, improvisational strategies (cf. Schryer, 2000; Zachry, 2007), hence developing an initial rhetorical flexibility. The accuracy of the engineering content is particularly important for the communication course project, as it seems futile to separate rhetorical expertise from domain content expertise (cf. Geisler, 1994). In my assessment of the accuracy of the engineering content of students' projects I rely on the knowledge accumulated over the years of my previous career as a metallurgical engineer and on my ongoing research into the teaching and practice of engineering.

METHODOLOGY OF THE STUDY

The study had an emergent design: at the beginning it was designed as an assessment of the pedagogical approach used in the ECC, and then it gradually developed into a qualitative, longitudinal exploration of former ECC students' trajectories in learning genres of engineering. The data analysis in the study is based on Charmaz's (2000, 2002, 2006) constructivist version of grounded theory (see Strauss & Corbin, 1998). In this study, I used a purposive self-selective sample of convenience (cf. Miles & Huberman, 1994; Patton, 1990) of ten volunteers from among my former ECC students (from the 1997-1998 and 1998-1999 engineering cohorts). The case study approach that I used in my research allowed for "progressive focusing" (Stake, 1995, p. 8); that is, it allowed me to reconsider and develop research questions through data collection and analysis. I collected data over the span of eight years (1997-2005), while engaging in a concurrent and recursive data analysis. The study received ethics approval.

I collected data through in-class questionnaires administered as part of the engineering communication course, electronic questionnaires regularly emailed to the participants, individual follow-up email messages sent for clarification of particular responses, one-on-one qualitative interviews, field notes, and samples of the participants' academic and workplace writing. I used the constant comparative method for categorization (coding) (e.g., Miles & Huberman, 1994) and complemented it with the analysis of the context, or connecting strategies (i.e., case studies and narrative summaries) (e.g., Charmaz, 2000, 2002, 2006; Maxwell, 2005; Maxwell & Miller, 1992, 2002). For the purposes of my study, I decided to adapt the form of representation known as Individual Case Synopsis (ICS) (Fischer & Wertz, 1979) to present an *individual* participant's learning trajectory in her learning of engineering genres, with a focus on change through time. Such ICS were developed for four study participants who provided me with a particularly detailed and complete body of data. For the remaining six study participants, an overall summary of experience was written.

The study used multiple ways of triangulation: (a) data triangulation, provided by the use of multiple study participants and a variety of data sources in a study; (b) theory triangulation, achieved through a combination of multiple theoretical perspectives used to interpret data, complemented with the theory building from the data; (c) methodological triangulation, achieved through the combination of categorizing and connecting strategies. I also employed member checks (e.g., Stake, 1995, 2000; Winsor, 1996) to ensure that study participants had an opportunity to verify my interpretation of the data collected from them. All ten participants provided me with member checks. The use of member checks assisted me in creating the ownership of the study that was shared by my participants and myself. The use of various triangulation strategies and the

multicase design allowed me to verify the interpretation of the data, and thus, to further validate the study.

Stories of Becoming: Four Individual Case Synopses

Four out of ten participants—Bill, Sami, Rebecca, and Moe (the participants are identified by pseudonyms)—supplied me with a large body of data, over 50 sources of data each. These participants' stories are presented in the abbreviated Individual Case Synopses below (for complete ICS see Artemeva, 2006).

Sami's and Bill's fathers were engineers (for a detailed discussion of Sami's case, see Artemeva, 2005). Sami and Bill (Bill's case was also discussed in Artemeva, 2008) grew up surrounded by "war stories" (Lave & Wenger, 1991)—that is, oldtimer's stories about the practices of the engineering profession. They both had various engineering-related experiences through the years before and at the university and had an opportunity to work under the supervision of mentors who had helped them to enter engineering communities of practice. For example, Sami, who was a third-generation engineer, often referred to his father as a major influence in his life. Thus, he once noted, "I became an engineer because my father is one" (16 September 2003). Bill's father helped him to obtain a co-operative placement at an engineering company when Bill was a high school student. This had allowed Bill to enter an engineering CoP very early, and to work under the mentorship of experienced oldtimers for a few years before he entered an academic engineering program. In other words, both Bill and Sami had acquired their families' cultural capital related to the engineering profession at a very early age, and, thus, had been socialized into the engineering practices even before they formally entered the world of engineering (Artemeva, 2005, 2008).

Shortly after graduating from university, both Sami and Bill were able not only to join engineering companies and work productively, but also to change communication practices of their companies. For example, Sami, shortly after being hired by an engineering company, encountered a situation in which his immediate supervisor was asked to propose a solution to an engineering problem. Sami seized this *kairotic* moment and proposed his own solution. He wrote a proposal by using—as he explained in an interview—everything that he had learned in the ECC. For example, he went to the company's library and studied backgrounds of all committee members who would evaluate the proposals in order to learn how much background knowledge and technical details to provide in the proposal so that each of the committee members could understand it. The genre of the proposal that Sami used, as he observed, was based on his learning experiences in the ECC, rather than on the genres traditionally used in the company. (Please note that none of the study participants ever used the term *genre* in their responses). Even though the genre of the proposal that Sami introduced differed from the genres used by the company, engineers and managers

recognized the effectiveness of the new genre, accepted his engineering solution over the proposal that a company's oldtimer presented, and quickly promoted him (Artemeva, 2005).

Bill continued his engineering studies in a graduate program. After finishing his Master's degree he was hired by a small start-up company. In the new workplace, Bill discovered that, in his opinion, many of the communication practices used by the company were inefficient. In an e-mail, he commented that the company employees "are not doing any record keeping at all. Because the people [who are] doing the design work are two or three people. They talk at lunch" (05 March 2002). On his own initiative, Bill was able to gradually introduce more efficient ways of internal communication and communication with customers. The new communication strategies that he proposed on the basis of the ECC and his previous engineering workplace experiences were accepted by the company and included in its genre system (Artemeva, 2008).

In other words, the new communication practices that Sami and Bill had introduced were recognized as acceptable and approved by oldtimers in their engineering CoPs. Both Sami and Bill referred to the engineering communication course and their other engineering-related experiences as the sources of their understanding of how professional genres work. In other words, their audience awareness, relevant cultural capital, the ECC and workplace experiences, understanding of engineering genres as allowing for flexibility, engineering knowledge, and the ability to seize and create a *kairotic* moment and respond to it proportionally allowed them to enact genres in such a way that these genres, though changed and/or not developed locally, remained not only recognizable by professionals but also were acceptable as best practices (Artemeva, 2005, 2008). Sami's and Bill's stories illustrate the crucial role of cultural capital, domain content expertise, and agency in a rhetor's ability to both seize and create *kairotic* moments in the chronological flux of time and respond to them in a proportional manner. These stories also underline the importance of the rhetor's understanding of the improvisational qualities of genre.

Another participant in my study, Rebecca, unlike Sami and Bill, initially lacked knowledge and understanding of what the engineering profession entailed. In the first year of university she felt confused and could not understand practical applications of the courses she was taking. In response to the question that I asked all students at the end of the communication course, "Have you learned any useful communication strategies in [the ECC]?" Rebecca responded, "No." A term later, in response to the same question, she wrote in an email,

> Yes, actually [I have]. . . . [The ECC] . . . provided a basis of knowledge for . . . [new types of] reports [that students are re-

> quired to write in second-year courses] since they are not based on what was learned on writing reports in the first year courses. These lab write-ups include an extensive amount of documentation and written work. . . . Most of the concepts presented in the [ECC] are quite useful. (25 March 1998)

A year later, after she had worked in an engineering firm for a few months, Rebecca's response to the question "Did [the ECC] help you in your engineering course work?" was, "There was theoretical value in . . . [the ECC] . . . such as organization of long projects. . . . The great thing that I found quite worthwhile was the final report, and the orals/abstracts/proposal that went along with it" (30 October 1998).

Leont'ev's three-level model of activity (activity; action; operation) as a theoretical tool allowed me to unpack changes in Rebecca's perceptions of the ECC usefulness for her engineering studies and work. When Rebecca had reacted negatively to the whole course at the end of the term because, as she noted retrospectively, at that time a lot of course activities seemed to have lacked "a 'point' or a foreseeable goal" (21 April 2002), she was providing me with a fairly common novice's perception of an academic course in an unfamiliar discipline. Rebecca's cultural capital did not appear to include familiarity with the expectations of the engineering profession, and she had not been exposed to the field before taking the ECC. She took the communication course at the very beginning of her engineering studies when her domain content knowledge was practically non-existent. All these factors made it unfair and unrealistic to expect that she would gain the understanding of the integral role of communication in engineering from an introductory communication course.

Only with time and after having experienced situations that required the use of strategies learned in the ECC for other purposes, that is, other courses and/or work, Rebecca began to realize that discrete course exercises had not been as randomly discrete as it had appeared while she was enrolled in the course (as Rebecca demonstrated in the third response). It is significant that, as time passed and as Rebecca became more involved in the context of engineering—both as an academic discipline and as a profession—her view of the effects of the ECC changed from the abrupt "No" in her first response, to the recognition of the usefulness of particular course activities in the second response, and to the view of the course as a whole in which all discrete activities finally found their place (in the third response). Several years later, when Rebecca was working in an engineering workplace and felt very comfortable communicating professionally, she noted, "I'm lucky that I get to do the same work [in the workplace] as what I took in University—I'm using the vast majority of my education to help me

with my job" (18 September 2003). In other words, to learn a genre, as Dias et al. (1999) observed, one needs to use it *to get things done* with a particular purpose in an authentic setting.

Rebecca's story indicates that her mastery of engineering genres occurred later than in Sami's and Bill's cases and was based on her academic experiences in engineering classes, the ECC, and workplace experiences in the various workplaces where she worked throughout the years of her academic studies. By the time she graduated from the university, she was also able to develop her own communication strategies that helped her integrate into an engineering community of practice. The fact that she had lacked relevant cultural capital made her learning of engineering genres and developing her own rhetorical strategies slower than in Bill's and Sami's cases; however, she was able to learn from the ECC, other academic experiences, and the workplace environment and use what she learned in her workplace to develop successful rhetorical strategies.

The fourth study participant, Moe, enrolled in the engineering program expecting to be able to make much money after graduation (for a detailed discussion of Moe's case, see Artemeva, 2008). Moe lacked the relevant cultural capital and private intention (Miller, 1984/1994) to develop into a professional engineer: he did not know much about the profession when he started his studies, did not know any engineers, was not particularly interested in the engineering program, and was soon discouraged. He explained his motivation to choose an engineering university program by saying that "at the time, engineers were in demand and made very good salaries" (25 July 2003). Unlike Sami, for example, who constantly referred to what he had learned in the ECC, Moe repeatedly commented in the interviews that he had taken the ECC in the first year and "because I took it way back . . . I don't remember anything" (12 February 2001). He often mentioned that because he could not remember "anything" from the communication course, he had avoided writing tasks at the University (e.g., he would say, "I was doing the lab and my friend was doing the writing") and relied on other students, the "guys [who] are better than me in that" (12 February 2001). Unfortunately, university practices seemed to allow him to avoid the few opportunities to engage in engineering writing that the engineering program offered.

Paré & Le Maistre (2006) observed that higher education often creates passive learners who wait for knowledge to be imparted to them; such learners may miss the chances that wait for them outside of academic institutions. For example, at first, Moe could not find any full-time engineering employment, and later, he developed an ambition to become an entrepreneur rather than an engineer. He began by participating in business proposal competitions for young entrepreneurs that the University offered in partnership with local businesses

and a government program. However, none of his attempts to secure funding for his enterprises was successful. He repeatedly included unrealistic budgets (hundreds of millions of dollars for a small start-up business) in his business plans and nearly missed deadlines for grant application submissions—*kairotic* moments—by writing his business plans at the last minute. It does not appear that Moe's sensitivity to professional genres and, in particular, to the genre of the business grant proposal, developed in any way, even after several attempts to apply for funding. Moe's repeated failures to secure an engineering job and to obtain funding in young entrepreneurs' competitions indicates that in his case, learning of relevant genres did not occur to the same extent as in Sami's, Bill's, and even Rebecca's cases (Artemeva, 2005, 2008).

Bereiter and Scardamalia's (1983) metaphor of high road and low road in learning to write seems appropriate in the discussion of Moe's learning trajectory as compared to those of Sami's, Bill's, and Rebecca's. According to Bereiter and Scardamalia, "The high road is characterized by struggling to master the art of writing in all its complexities. . . . The low road is characterized by striving to avoid or minimize the burden of those same complexities" (p. 24). Their main objection to the choice of the low road is that "it keeps writing from having a role in a person's mental life. . . . people who know only the low road of writing do not have a mental life in the same sense that people on the high road do" (p. 28). It appears from the Individual Case Synopses that Sami and Bill chose the high road, and Rebecca, though she had struggled at the beginning, did eventually develop communication strategies that eased her integration into the workplace context, while Moe was following the low road. The choice of the high or low road may also be dictated by private intention: while Sami, Bill, and Rebecca either before or during their university studies made a decision to become engineers, Moe was not happy about his choice of the discipline. His dominant motive, according to him, was to make as much money as possible, which is a legitimate but very different motivation. It might have caused him to look for faster ways of achieving his goal, which, in the context of my study, may appear closer to the "low road." It is clear from his ICS that his strategies did not lead to the immediate success because none of his proposals won the competitions and he had to finance his enterprise himself. Moe's story provides evidence that his difficulties in learning and using appropriate communication strategies might have been caused by his lack of relevant cultural capital, inability to recognize, seize, and respond proportionally to *kairotic* moments, and his markedly different private intention (to make a lot of money rather than to become a professional engineer).

Nearing the end of my study, I asked for the participants' views on the effects of the study on the development of their ability to reflect on their own

professional communication practices. Sami observed, "[the study] allowed me to verbalize certain situations leading me to better understand what had happened [to me] and why" (23 May 2005). Bill responded, "your interest in my communication experience has caused me to reflect on my progression, and I've definitely learned something about myself through this process" (21 May 2005), while Rebecca added, "participation in the study has provided a time capsule for myself. Reading the [ICS] has shown how much I've changed from my educational career to my working career" (16 May 2005). These responses provide evidence that the qualitative methodology used in the study did not only allow for the collection of rich data and their multidimensional analysis, but also involved the participants in a reflective practice. Their last comments, in a sense, validated the study even further and suggested that the ownership of the study has indeed become shared between my participants and myself.

CONCLUSIONS

The four Individual Case Synopses presented in this chapter illustrate some possible applications of the integrated theoretical perspective to the analysis of genre learning in transitional contexts (Artemeva, 2008). They indicate that RGS, AT, and situated learning *can* be integrated into one theoretical framework which can allow professional communication researchers to focus on the roles of the knowledgeably skilled identity and individual agency, and the tension between agency and the social forces that affect the processes of professional genre learning.

The four ICS presented in this chapter shed light on the first question that I raised at the beginning of the chapter: what does it mean to master domain-specific genres, and in particular, the genres of engineering? The study allowed me to uncover the ingredients of genre knowledge and provided evidence that learning professional genres does not occur in a smooth, uninterrupted way which starts in the communication classroom and continues throughout the engineering program (Artemeva, 2008). Novices accumulate these ingredients throughout their lives from different experiences and encounters. The novices' cultural capital and private intentions appear to have a profound effect on their development as professional communicators. These ingredients, once acquired, help novices to become sophisticated users of professional genres.

A related question that I posed at the beginning of this chapter was: is it possible to teach domain-specific communication practices apart from the local contexts in which they occur? In other words, if we teach, for example, engineering communication strategies in a university course, are these strategies at all portable to workplace contexts? Can they be productively used by novices beyond the classroom context and would these strategies be accepted by oldtimers

as legitimate professional rhetorical practices? While Moe's story indicates that the low road he had chosen in learning engineering communication practices and his narrow understanding of what "learning" of professional communication entails might not have lead him to successful genre learning and implementation (cf. Julie's case in Freedman & Adam, 2000b), Sami's, Bill's, and Rebecca's stories demonstrate that such practices *can* be taught in carefully designed communication courses, and thus provide evidence that academia and the workplace may not always be "worlds apart," to use Dias et al.'s (1999) phrase. That is, the findings of the study indicate that we may be able to teach domain-specific communication strategies apart from the local contexts, and that such teaching, if carefully constructed and theoretically grounded, can serve as *one* of the ingredients of professional genre knowledge.

As I observed, genre knowledge in those novices who had exhibited the ability to use engineering genres successfully—and even changed some and/or introduced new workplace genres—was a result of a summative effect of various genre knowledge ingredients accumulated from different sources at different time periods. The various sources of such genre knowledge ingredients included, but were not limited to, the classroom and workplace practices. The interpretation of the data suggests that, in addition to the knowledge of genre conventions and understanding of the audience's expectations, the following ingredients contribute to the formation of professional genre knowledge:

(a) agency, as reflected in the novice's ability to both seize and create *kairotic* moments in the chronological flux of time, respond to them proportionally, and enact genres in the ways that are recognizable by the community of practice;
(b) cultural capital;
(c) domain content expertise;
(d) formal education;
(e) private intention;
(f) understanding of the improvisational qualities of genre; and
(g) workplace experiences.

All these ingredients of genre knowledge helped the novices to understand the intricacies of domain-specific engineering genres (Artemeva, 2005, 2008).

It is notable that, contrary to the findings of some previous studies on the university-to-workplace transition (e.g., Anson & Forsberg, 1990/2003; Dias & Paré, 2000; Dias et al., 1999) and more recent work on academic writing in the disciplines (e.g., Fogarty, 2007), neither Bill nor Sami or Rebecca had difficulties drawing on genres learned in the classroom context when applying them in the

workplace context.

Even though the study presented in this chapter suggests that some ingredients of genre knowledge *can be* taught in a classroom context like the one provided in the ECC, for the genre knowledge to become active and for the individuals to be able to apply this knowledge successfully, it needs to be complemented by other genre knowledge ingredients accumulated elsewhere. In other words, the findings of the study again raise a question of the portability of rhetorical strategies across contexts, but from a different perspective. It appears that rhetorical strategies *may* be portable but only if a novice *already* possesses a combination of particular genre knowledge ingredients (Artemeva, 2005, 2008). This research once again indicates that our understanding of the processes of professional genre learning is far from complete and that the teaching of professional communication must be firmly grounded in empirical research in order to be of use to our students. More research is needed to further explore the complex processes of professional genre learning.

NOTES

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