Academic and Scientific Texts: The Same or Different Communities?

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Abstract
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Keywords
academic writing, scientific writing, community, genre, ethnography(ic), thesis, Bologna process, systemic functional linguistics, rhetoric(al), corpus analysis, activity theory

Disciplines
English Language and Literature | Higher Education | Modern Literature | Rhetoric and Composition | Technical and Professional Writing

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Chapter 1:

Academic and scientific texts: the same or different communities?

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Abstract
This chapter analyzes the question of how and why texts written by students are similar to and different from texts written by researchers, in various disciplines and professions. The question is complex because it involves not only linguistic or textual differences, but also social and cultural differences—the communities and practices involved. This chapter first provides a brief theoretical and a schematic analysis of the complexity. It charts the relationships between writers and audiences in different social contexts and genres: academic and non-academic on one axis, scientific and non-scientific on the other axis. And the chapter suggests the stakes involved, as the distinctions are more than terminological. Distinctions may indicate fundamental differences in the way writing, learning, and research are conceived and practiced inside and outside formal higher education—and the way the identities of students, teachers, and researchers are constructed. The distinctions also in many ways determine what genres of writing get taught, to whom and by whom and for whose purposes. The chapter then briefly surveys several major research traditions that have taken up the problem: applied linguistics, linguistic anthropology/sociolinguistics, and rhetoric/professional communication. Finally, it discusses some of the methodological consequences this complex problem raises for research into academic writing, and some of the practical problems it raises for teachers and educational policy makers, in terms of what genres to teach to whom, and when and where to teach them.
The question our title poses has neither single answer nor a simple answer. The purpose of this chapter—and in large measure this book—is in large part to explore its complexity.

The question is at one level terminological, a question of particular usage. The authors of this collection agree that “academic” means having to do with higher education (though in France the term carries such negative connotations (“formal, conventional, even pretentious”) that researchers prefer the term “university literacies” (Delcambre & Donahue, p. x). The term “scientific” is a bit more difficult. In Anglo-American countries, it refers to the natural sciences and much of the social sciences, but not the humanities. In much of continental Europe, “scientific” refers to all disciplines, including the humanities—any discipline that systematically studies something. It is in this continental sense that this article uses the term “scientific,” in order to distinguish the writing of students from that of professionals, though we realize this is ambiguous, and that other authors (e.g., Nelson and Castillo) specifically use the term “academic” for both. Still others (e.g., Rinck & Bosch) use the term “academic and research writing” to distinguish the two.

But at a deeper level, our title question is also institutional and systemic, and here is where distinctions are more than terminological, because they may indicate fundamental differences in the way writing, learning, and research are conceived and practiced inside and outside formal higher education—and the way the identities of students, teachers, and scientists (broadly) are constructed. We have tried to capture the complexity in Figure 1 [BELOW AND BOTTOM OF DOCUMENT], which shows the relationships between, on one axis, scientific and non-scientific texts, and on the other axis, academic and non-academic communities.
Figure 1. Some relationships among texts/genres and communities, academic non-academic, scientific and non-scientific

Obviously at some levels and at some times, those categories interpenetrate in terms of intellectual and psychological development, as well as in terms of institutional categories. And
for students (arrows 1-3) such penetrating into the world of professional work is the goal of higher education and their goal. For example, a thesis is published in a scientific journal becomes an article. Indeed, from one perspective—perhaps the dominant one—the goal of writing academic texts is to prepare students to write scientific texts, to reproduce the professoriate (arrow 1) or to do research in non-academic institutions (arrow 2).

But this is not the whole story, of course, because most students do not go on to become scientists in this sense, to do research and make new knowledge (and write scientific articles or books). In most disciplines most all of them become professionals in non-academic institutions doing writing that is not scientific by any strict definition (arrow 3). They go on to do myriad other things in myriad genres (Ivanic et al. 2009). Teacher-researchers prepare (form) practitioners in many fields who do not do scientific research for publication but who nevertheless carry out systematic inquiry, whether a therapist looking into a client’s neurosis or a veterinarian looking into a horse’s mouth. And again they write myriad kids of texts, myriad genres (to use another term we will take up later). This becomes most evident in research into the writing practices of certain groups, such as teachers-in-training (Daunay et al. 2006), where practitioners must learn the discursive practices of the field. There they write genres that, though not research in the strict sense, at least require them to think scientifically. They re-present their discipline/profession in what they write (to “discipline” their thinking and their activity). However, these workplace genres are almost never required of or taught to students in HE, though they can be.

Although we are considering academic those texts written by students and scientific those written by scientists, we must not ignore the simple fact that in higher education in most countries, researchers are also teachers. The current French hyphenated phrase sums it up
neatly: enseignant-chercheur, teacher-researcher. Both students and teachers are part of the same institution. Scientists working in higher education as teachers do not write only scientific texts. They often write ‘academic’ texts for students such as teaching materials, syllabi, textbooks, manuals, and so on, as well as occluded genres (Swales’ 2004 term) such as feedback on student writing, emails to students, and so on (arrow 4). They also write a wide range of bureaucratic texts within the ‘academic’ institution: committee reports, curriculums, and so on (Lea & Steirer 2010; see also Lea, and Scott and Welikala, in this volume).

Disciplines and their researchers within higher education are linked to researchers outside higher education through their shared goals, methods, ethos, professional organizations, journals, meetings, and so on (arrows 5 and 6), though there may be a tension between ‘pure’ and ‘applied’ research. In most countries there are institutions (institutes) devoted exclusively (or almost) to scientific research, without any formal relationship to institutions of higher education, though researchers often move back and forth between the two.

These “non-academic” researchers certainly work at the service of business, government, and so on through their research and texts (arrow 7)—or attempt to influence those institutions (arrow 8). These sites of non-academic research may be government funded or private. Indeed, the majority of scientific research goes on in corporations and other for-profit institutions, though their findings are often not shared, as they are proprietary. And much research also goes on in non-profit, non-governmental “research and advocacy” organizations (e.g., NGOs). And these produce a research that is termed “grey literature,” because it attempts to influence public policy and is not typically published in scientific journals (Lindeman, 2007). Of course relationships among scientists in all these institutions are often close, at times too close for some. It may be that linguistically they might be considered all part of one “community” of
Disciplines, professions and their researchers in higher education are often deeply influenced by institutions beyond those of higher education, most obviously through funded research, from governments, corporations, NGOs, and so on (arrow 9). And here tensions are often great between interested and disinterested research, so-called. But academic researchers also often attempt to influence government (and other) policy, and may write genres such as white papers, reports, popularizations, and so on (arrow 10). Finally, to come full circle, business, government, NGOs, etc. also influence or attempt to influence the teaching of students in higher education, which also often produces tensions (arrow 11). And scientific researchers outside formal educational institutions rely on formal higher education for future scientists/employees and attempt to maintain quality through gatekeeping and other means, such as accreditation (arrow 12).

The diagram and its analysis do not consider two other factors that profoundly influence the question in our title. First, each nation and culture has different attitudes toward these differences. In the US, for example, the term “professional” is associated with middle class or “white collar” work; in France, by contrast, “professional” work is associated with people from all walks of life, the métiers, and as Delcambre and Donahue point out, there was until recently a “clean split between vocational training and “academic” education.” Second, each national education system has different institutions, with different expectations for writing and
literacy. (See also, this volume, Castello and Inesta; Dysthe; Delcambe and Donahue.) With these *distinctions* (as the sociologist Pierre Bourdieu has long argued) come different communities, values, attitudes, even physical postures (*hexis*)—and of course different writing and textual practices. These have been the objects of research on writing (e.g., CDA below, and see, this volume, Chitez, Kruse, and Donahue.)

For the study of student writing, these questions are important, because they influence deeper questions: What sorts (genres) of text will be admitted in higher education? What sorts of people will be produced (identity) and what kinds of people will be admitted as teachers (e.g., will practitioners from these other domains and institutions be allowed to teach, as in engineering or creative arts)?

In this chapter, we will take a broad view, seeing both academic and scientific discourse and practice as functioning parts of wider networks of communication, political, social, etc. We will consider several different research traditions that speak to important aspects of this functioning. This will allow us to see the relation between academic and scientific texts as a problem (or problematic, in the continental tradition) involving a wide range of disciplines: linguistics and applied linguistics, rhetoric, rhetoric of science, sociology, sociology of science, psychology, social psychology, ‘writing studies,’ technical communication, business communication, etc.. These traditions of research on texts and writing also grow out of different regional, national, and institutional/system contexts, and address different intellectual problems and practical issues. For example, some research traditions focus on the thesis, or second language writers, or writing across the undergraduate (first cycle) curriculums. Indeed, one of the goals of this volume is to make researchers in some traditions aware of research in other traditions, and the reasons for those differences, as well as the commonalties in the
practices.

Obviously this chapter will not be a comprehensive literature review. All we can hope to do is provide an informal theoretical perspective, an overview from a high-flying airplane. But we will point readers to different literature reviews and seminal work in each one of the areas we mention. We also do not venture much into research in languages other than English. This is not because of a paucity of research there, but because of our ignorance of it. Where we do know some of that research we mention it, and we apologize here for not being competent to include more—and invite reviews of those writing research literatures to be disseminated. We also do not mention here the large literature from cognitive psychology on writing in higher education, again not only because of our lack of knowledge of it but also because it does not, in the research traditions we the authors of this chapter are familiar with, bear directly on the problem of the relation between the two communities and their texts. Other traditions, such as those of Mateos and Solé in this volume, look at students’ perspectives on academic and scientific texts from a cognitive perspective.

We organize this overview by research traditions, first of all, and for each tradition we discuss how they approach the two major problems the title raises. The first problem is describing the academic communities and their texts—and the relation between the two (formal schooling and its associated institutions), as well as the scientific communities and their texts—and the relation between those two (scientific inquiry and its associated institutions). The second problem is that of describing the relationship between the two communities through their texts.
Applied linguistics traditions

In most applied linguistics traditions, the focus is on analyzing the needs of students (or novices more generally) through analysis of scientific texts, and, to a lesser extent, the texts that students produce in moving toward writing those target texts, what we are calling here academic writing. The term Language for Specific Purposes (LSP) describes this effort broadly, which is mainly at the service of language teaching in second or foreign language learning settings in higher education. Although there have been important studies of non-academic texts (e.g., English for hotel maids, brewers, air traffic controllers), the great majority of studies have been on what is called Language for Academic Purposes (LAP) and the great majority of these on English for Academic Purposes (EAP) (Johns, 1981). EAP is further classified into English for Science and Technology (EST), the oldest and by far the largest, English for Medical Purposes, English for Legal Purposes or English for Management, Finance, and Economics, and so on (Dudley-Evans & St. John, 1998). For the applied linguistics traditions we are discussing (mainly anglophone) the expression academic writing includes both novice and expert writing, often referred to as student writing and published writing, and involves not only professors writing as researchers, but also brochures, syllabuses, recommendations, reviews, etc. The assumption is, as Biber (2006) explains, that one needs to provide full linguistic descriptions of those registers in order to help students in higher education learning to use language in new ways and for new purposes. The four main research traditions below have addressed the problem our chapter takes up. These traditions general answer the question about academic and scientific texts posed in our title in the affirmative, by distinguishing the two as a matter degree of expertise in some field, some disciplinary community.
Swalesian approaches

In a seminal study, John Swales (1981) investigated what was “really going on in the composition of” (p. 13) the introduction sections of experimental articles in scientific journals. His goal was to inform the design of teaching materials for non-native university students in science. This dominant genre in natural sciences (and many social sciences) has a set structure: Introduction, Methods, Results, and Discussion (IMRD or em-rad). For further discussion of the IMRD structure, see Robinson-Pant and Street; Carlino, this volume.

Swales and others (1990, 2004) found that almost all introductions to experimental articles in almost all disciplines have three common “moves” 1, Establishing a territory; Move 2, Establishing a niche; and Move 3, Occupying a niche. But each move can be realized in a variety of ways. “A move in genre analysis is a discoursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse” (Swales, 2004, p. 229). Moves are identified not strictly by the presence or absence of certain words or syntax, but by analyzing the meaning in context and making judgments about the communicative purpose of each stretch of discourse. Given that moves are genre-bound, they can be considered building blocks to be taught to novice writers to successfully compose texts in that genre (Dudley-Evans, 1995).

Even though move schema are primarily used in the analysis of the different sections of the research article (see for example, Crookes, 1986; Kanoksilapatham, 2005; Thompson, 1993; Williams, 1999; Wood, 1982), this methodology has been extended to other research genres (Swales, 2004) such as book reviews (Motta-Roth, 1998) or review articles (Myers, 1991, Noguchi, 2001). Swalesian analysis shows that scientific texts are in genres that have certain
regularities that non-scientific texts do not. And academic (student) texts can be taught and
evaluated in terms of those genre regularities.

**Corpus approaches**

Computer analysis has extended knowledge of the relation between texts and communities by
allowing more subtle and more reliable distinctions to be made—thus both illuminating and
complicating the question posed in our title. Computers now make it possible to quickly do
quantitative analysis of the language of not just a few texts but thousands of texts, leading to
more informed qualitative analysis. In the last three decades applied linguists have assembled
for analysis *language corpora*: large numbers of texts collected according to strict principles
of size, sampling and representativeness closely related to the purpose of that collection (e.g.,
experimental reports in nuclear medicine journals in the last three decades).

In the last ten years, corpus-based methodologies have been favored in applied linguistics to
investigate writing in many different communities, but the bulk of the studies conducted using
this approach have been in LAP. Some studies look for grammatical features that researchers
suspected occur more frequently in academic/scientific prose, such as passive voice, or tense
and aspect combinations like present perfect verb phrases (they do) (Biber, Johansson, Leech,
Conrad, & Finegan, 1999) Or researchers do “bottom-up” searches to see what patterns
emerge. For example, *lexical bundles*, groups of three (or four or five etc.) words that
frequently recur in a corpus reveal differences between disciplines, and between novice and
expert writing within disciplines.
Some corpus studies have specifically looked at the differences between scientific (expert) and academic (novice) texts written by students in several fields. For example, Conrad’s (1996) study of history and biology students found that writing becomes increasingly more informationally dense as students advance in level. Cortes’s (2004) study of lexical bundles in student and published writing showed that while published authors made frequent use of certain recurrent expressions (e.g., as a result of, on the other hand, the fact that the), students rarely used them, and in the few occasions they did, the function the expressions performed was slightly different from those they conveyed when used by published authors. (See Boch and Rinck, this volume, for analysis these sorts of linguistic features using different methods).

Corpus analysis has been applied not only to experimental research articles in different disciplines, but also to book and article reviews, course syllabi, university admissions materials, master’s theses and doctoral dissertations (Hyland, 2008), or the use of particular linguistic features such as evaluative that (Hyland and Tse, 2005) or conditional sentences (Ferguson, 2001).

It is undeniable that corpus-based methodologies have brought about important advancements in the research of academic writing. The findings of these studies provide invaluable information for the better description of the discourse of academia that can be directly applied to the teaching of these registers to L1 and L2 writers. And they add to and complicate our understanding of the relationship between academic and scientific, student and expert writing in a range of disciplines and across disciplines.
Systemic functional approaches

Systemic Functional Linguistics (SFL) has made an important contribution to academic writing research and pedagogy, particularly in Australia (Jones, 2004). Drawing on M.A.K. Halliday’s views of language, genre in SFL has its origins in the work of Martin (1989), and Christie (1991). SFL approaches describe texts in terms of the functions they perform and the way in which the elements that constitute those texts are organized to perform those functions. Martin (1984) defines genre as “a staged, goal-oriented purposeful activity in which speakers engage as members of our culture” (p. 25). SFL views texts in relation not to communities, per se, but to registers, linguistic manifestations of communities, analyzed in terms of the ideational, interpersonal, and textual functions of meaning-making. The register is the context. That is, text is analyzed in terms of the surrounding texts; context is constituted by texts.

SFL has extensively analyzed important registers of scientific writing, particularly those of the natural sciences and certain of the humanities, especially history. Halliday and Martin (1993) analyze various linguistic English such as interlocking definitions, special expressions, lexical density, syntactic ambiguity, and grammatical metaphor, among others, providing examples extracted from scientific writing of many genres and many historical periods, beginning with the origins of modern science in the 17th century.

Martin’s notion of genre has been extensively used in the teaching of academic writing in the Sydney School of genre studies (Hyon, 1996). Christie (2000) analyzes teaching and learning as staged and purposeful” social activities, “leading to the creation of classroom genres” (315). Using systemic functional grammar, the analyst can trace patterns of language and literacy in progress over time and in differences in discourse across school subjects. Most SFL research
has been on academic writing at the elementary and secondary school level and L2 university work, but there is a considerable literature on L1 post secondary education. Especially notable are attempts to integrate literacy skills into particular disciplinary courses or curricula, such as accounting (Webb et al. 1995), pharmacy (Jones et al. 2000), geography (Purser 2008), and a range of disciplines at Woolangong University (Skillen et al. 1998).

**Critical discourse analysis**

Critical Discourse Analysis (CDA) finds its origins in Critical Linguistics, which started at the University of East Anglia in the 70s (Flowerdew, 2008), and was powerfully influenced by SFL. This movement was led by Fowler (1991, 1996) and included names such as Kress and Hodge. These scholars focused on the development of a social approach to linguistics with a theoretical core in power relationships and the text as its unit of analysis. For CDA, “language use is always social” and “discourse both reflects and constructs the social world” (Roger, 2004, p. 5). CDA focuses, for example, on issues of gender, ideology, and identity, and on how these issues are reflected in particular texts (Paltridge, 2006). It is difficult to define CDA but Fairclough and Wodak (1997) present a number of principles which have been used as a rationale for many studies in the field:

- discourse constructs and reflects social and political issues
- discourse helps negotiate and perform power relations
- social relations are reflected and reproduced by discourse
- the uses of discourse produce and reflect ideologies

For Van Dijk (2001), CDA studies “the way social power abuse, dominance, and inequality are enacted, reproduced, and resisted by text and talk in the social and political context” (p.
and the task of critical discourse analysts is to take a position and try to comprehend, describe, and resist social inequalities.

Although power and dominance are associated with specific domains such as education, studies on academic writing in higher education that employ CDA are rare. CDA has very much influenced ACLITS approaches, however (see below). An important exception are critical studies bureaucratic discourse of higher education, such as Fairclough’s (1993) famous analysis of a page from the 1990 undergraduate prospectus of Lancaster University, in which he shows the closeness of university discourse to consumerism in late capitalism. In this and other respects, CDA helps to answer our question by pointing out the relations between texts of all sorts and communities of all sorts, within and beyond academe. And it sees the question in political terms.

CDA has been strongly criticized for relying too much on theory and global contextualization, that is concentrating too much on the power relations that take place in the context in which the texts occur and not linking those generalizations about ideology to the text itself, (Toolan, 2002). It has also, like SFL, been criticized reading off sociological or ideological contexts from texts without support of other sorts of evidence beyond the text/s analyzed (Slembrouck 2005). The next group of traditions addresses that concern.

**Linguistic anthropology and sociolinguistics traditions**

Research on writing has also approached the problem of scientific and academic texts and communities from the perspectives of linguistic anthropology and and sociolinguistics, in the tradition of Dell Hymes (1977) in the US and Basil Bernstein (2000) in the UK. The focus is
on understanding the *practices* of the *communities* around language use. Indeed, the term practice (evoking sociologist Max Weber’s notion of social action and the Marxist concept of praxis) and the term community (evoking the sociolinguistic concept of ‘speech community’ and later ‘discourse community’) suggest the importance for these traditions of going beyond language per se or even the functions of language to observe people using language, with the methods of the anthropologist or sociologist.

*Classroom ethnography and writing*

The first important research on writing in higher education out of the Hymes tradition comes from research for the U.S. Writing across the Curriculum movement, an educational reform whose goal is to help teachers in the disciplines improve their students’ academic writing and their learning through writing. A student of Hymes’, Lucille McCarthy, wrote “A stranger in strange lands: A college student writing across the curriculum,” (1987) a study of one first-year U.S. student’s struggles to write in courses in different disciplines. Her participant, Dave, experienced great difficulty when asked to write in radically different genres in biology, poetry, and composition classes, with little sense of the scholarly and research activities of the disciplines that motivated those genres. And the theme of misunderstandings of students and university teachers is central to later work in the U.S., France, and England (See, this volume, Lea; Scott and Welikala; Delcambre and Donahue; Robinson-Pant and Street.) Later work by McCarthy and Fishman (2002) takes up issues of class and race in university classroom discourse and writing, and takes up an even older tradition of analyzing the relation between school and society in communication in communities, that of John Dewey (2007). Much other work in other countries came out of WAC as researchers trained in U.S. methods returned to do work on other countries, such as Olga Disthe in Norway, included in this volume.
**ACLITS**

The ACLITS tradition began in the mid-1990s in England and emphasized studies of the practices of higher education students and teachers, focusing, as did McCarthy, on their differing perceptions of writing. It shares with CDA an emphasis on the critical analysis of identity and power relationships, but it gets its data primarily from interviews and, to a lesser extent, classroom observations and student texts. Research by Lea & Street (1998) introduced new theoretical frames to research on writing, which was, at the time in the U.K., still predominantly influenced by psychological accounts of student learning (e.g., Gibbs, 1994). Rather than frame their work in terms of ‘good’ and ‘poor’ writing, Lea and Street suggested that any explanation needed to examine faculty and student expectations around writing without making any judgments about which practices were appropriate. Drawing on the findings from an empirical research project conducted in two very different universities, they examined student writing against a background of institutional practices, power relations and identities, with meanings being contested between faculty and students, and an emphasis on the different understandings and interpretations of the writing task. Findings from their research suggested fundamental gaps between students’ and faculty understandings of the requirements of student writing, providing evidence at the level of epistemology, authority and contestation over knowledge, rather than at the level of technical skill, surface linguistic competence and cultural assimilation.

Based on their analysis of their research data, they explicated three models of student writing. These they termed study skills, socialization, and academic literacies. The study skills model is based on the assumption that mastery of the correct rules of grammar and syntax, coupled with attention to punctuation and spelling, will ensure student competence in academic
writing; it is, therefore, primarily concerned with the surface features of text. In contrast the academic socialization model assumes students need to be acculturated into the discourses and genres of particular disciplines and that making the features and requirements of these explicit to students will result in their becoming successful writers. In some respects the third model, academic literacies, subsumes many of the features of the other two; Lea & Street (1998) point out that the models are not presented as mutually exclusive. Nevertheless they argue that it is the academic literacies model which is best able to take account of the nature of student writing in relation to institutional practices, power relations and identities, in short to consider the complexity of meaning making which the other two models fail to provide. (See Lea; Robinson-Pant and Street, this volume, for additional brief overviews of AcLits.) Theresa Lillis (2001) critical ethnographic study of working class and L2 students entering higher education is a particularly important example of this work, combining qualitative and discourse analysis.

There has been little study of writing among scientists or other professionals in ACLITS. But recently Steirer and Lea (2009; and Lea this volume) have studied university lecturers' everyday writing as professional practice in the university as workplace, though not their scientific writing per se. Perhaps the most thorough study of the relation between writing in higher education and professions is Ivanic et al. (2009) Improving learning in college: Rethinking literacies across the curriculum, which is a multi-year ethnographic study of students and teachers in what is called “further education,” courses in catering, child care, and so on, and their struggles to make the transition across academic and scientific communities is highlighted. Lillis and Curry (2010) provide insight into academic and scientific intersections
in their study of researchers in non-English speaking countries attempting to publish in English language scientific journals, as do Bazerman, et al., this volume.

Rhetorical traditions

In rhetorical traditions, mainly the North American ones with which we are most familiar, the focus is on what writing *does* (in and among communities), and how it does it (Bazerman & Prior 2004). In one sense, both academic and scientific (or, more broadly, professional) writing are viewed as persuasive. The writers and their texts make arguments in order to have an effect on readers, but texts recently have been viewed as means of coordinating human activity more broadly. Academic and scientific texts are viewed as tools that people use—within and across communities—to carry on a host of different kinds of work, including constructing new knowledge and institutions, and maintaining, expanding, and contesting the old. In this view, texts and communities are dynamic, shifting, always only stabilized for now (Schryer 1993).

Stylistic analysis and beyond

Rhetoric has often been identified with style, but rhetorical studies of scientific writing from the 1980s and beyond have looked not only at style but also at content, or rather the invention of arguments, and the topoi, or places where writers go to find arguments. For example, Fahnestock (1991) identified the specialized topoi of Anglo-American literary criticism, such as *contemptus mundi*. Or researchers look at the rhetorical construction of scientific facts in the stylistic choices of scientists and popularizers as knowledge circulates in different genres (Fahnestock 1986). Other studies look at style as an index of the epistemology and social organization of disciplines. MacDonald’s seminal study of grammatical subjects in three subdisciplines (1994) shows how different the activity of knowledge building is in each field,
and how their motives, methods, and social organizations differ. This early work led to a wider field of study called the Rhetoric of Science (Gross, 1990), which forms the background for much study of students’ writing in reference to scientific writing.

**Technical and business communication research**

Another tradition of research on scientific and academic texts grew out of the teaching in the U.S. of business writing and technical writing, courses required of many students in their last year of university (first cycle). Before the 1980s, these courses had focused on static forms and conventions (e.g., memos, technical descriptions). But a new rhetorical approach to its teaching led to ethnographic and case study research on *Writing in Non-Academic Settings*, as the seminal study was called (Odell & Goswami & Odell, eds., 1985). Researchers examined ways writing is used in workplaces of various types; particularly the ways documents circulate to coordinate the activity of people across time and space. One of the workplaces they studied was that of scientific research, drawing on Bruno Latour and Stephen Woolgar’s seminal study *Laboratory Life* (1997) to examine scientific communication as workplace communication. Professional organizations and journals grew up in the late 1980s to support this research, which now has an international dimension as well.

**Activity and genre analysis (North American writing-in-the-disciplines tradition)**

In the late 1980's theorists and researchers in a range of disciplines began to investigate the ways that intellectual, professional, and cultural forms of work are mediated by writing—the *Textual Dynamics of the Professions*, as an important early collection is titled (Bazerman & Paradis, 1991). These studies grow out of the writing-in-the-disciplines movement in the U.S., which attempted to help students learn to write for specialized fields and “write to learn” their fields, though this research tradition has studied writing in all levels of schooling and
professional training, professional and workplace writing, writing within play and leisure activities, writing mediating various spheres of public and private activity, and writing in all media of production and dissemination, especially including electronic environments. Activity approaches use a variety of research methods, qualitative and quantitative—though all empirical, including surveys, text-based interviews, protocols analysis, and ethnographic observations, as well as discourse and linguistic analysis of texts (though the latter plays a much smaller role than in applied linguistics traditions).

Bazerman (1988) began the tradition of cultural-historical activity research into scientific writing because he wanted to understand the origins and functions of student writing, the humble undergraduate (first cycle) “research paper,” taught in U.S. first-year university writing courses for almost a century. He asked what kinds of writing go on among researchers in various disciplines, and how writing helps disciplines work. He focused first on the most important scientific genre, the experimental article (IMRD), from its beginnings in the seventeenth-century Royal Society through the twentieth century, to see how communities of science evolve textual genres and how students’ writing participates (or not) in that activity.

The concept of genre as social action (Miller, 1984) provided the theoretical genesis, which Miller (1994) has developed in relation to sociological theory, particularly Schutz concept of typification and Giddens's structuration theory (1984). This tradition focuses “not on the substance or the form of discourse but on the action it is used to accomplish” (151). Bazerman developed the notion of genre further with speech act theory into his theory of genre systems (1994), which traces how people and institutions use “stabilized-for-now” (Schryer 1994) patterns of communication to accomplish coordination of action and thought.
A second theoretical framework, Vygotskian activity theory from cultural-historical psychology, furnished a theory of the relation between writing and activity, particularly learning. Bazerman’s work was extended by a number of researchers who have examined student texts in academic communities in relation to scientific texts and communities, in various social practices. They found, for example, (Russell 1997) how student’s identities are shaped by genre systems linking higher education to research and other domains beyond formal schooling. In a series of case studies, he and others traced the ways students’ texts form developmental pathways, full of resistances often, however, and always conditioned by and conditioning institutional forms, and the texts outside schooling (Russell & Yañez 2003; Yañez & Russell 2009).

Drawing not only on Bazerman’s work but also on Bakhtin’s theory of speech genres, Paul Prior’s studies of graduate students’ development in applied linguistics, sociology, geography, and American studies extends Bazerman’s genre systems analysis to “the ways historical activity is constituted by and lays down sediments in functional systems that coordinate with various media with different properties” (1997, p. 36)--the messy flow of graduate students' literate activity over time in multiple "streams of activity". See, this volume, Prior and Bilbro’s related discussion of literate practices and disciplinary identities.

The most extended research in the North American rhetorical tradition on the similarities and differences between the writing of students and that of scientists comes from a Canadian group. In a series of case studies from the early 1990s to the present, these researchers explore the transition from university education in the workplace: the world of finance, industry, banking, law, in social work among engineers and architects and other professions. They use North American genre theory, situated learning, distributed cognition, and a version
of activity systems to draw the profound differences between writing at school and wrote the workplace-and ways in which student-writers become professionals who write.

The Canadian group has found significant continuities between all university writing and professional writing. But they are quite obvious: grammar, spelling, personal discipline, facility with writing, etc. But they found enormous differences, even in texts that looked very similar in terms of structure, lexicon, and grammar, because they come from two different activity systems. The most notable difference is in motivation. Students write for epistemic motives (to learn, or earn a mark) whereas professionals, including scientists, write for instrumental motives (write to get work done) (Dias et al 1999). The outcome for students is a mark, a credential, for professionals a product or service (even if that produce is an ‘article’). Student writing processes are primarily individual whereas professionals (including scientists) are collective. The audience for students is primarily the professor, for professionals primarily colleagues, who have a complex system of circulation of texts (for scientists academic journals, peer review, citation, commentary, and so on).

Further work on thesis writing and writers (Paré & Starke-Meyerling, 2009) used large scale interviews to understand the thesis as a "multi-genre", which addresses multiple requirements, which operates under multiple systems, and address multiple readers. Because of the Bologna process, and the consequent increase in the number of Masters and PhDs, thesis writing is a critical problem in Europe, and an object for European research (Rinck, 2006). And this is a theme in many of the articles in this volume (Dysthe, Chitez, Kruse and Donahue, Castelló and Iñesta and Rinck and Boch).
Finally, there have been many critiques of teaching scientific discourse to undergraduates as limiting their creativity and knowledge-making capacity (Thaiss & Zwacki, 2006) and a critical analysis of writing as initiation or apprenticeship at the expense of personal development and interdisciplinary prospects.

**Conclusion**

We end not with an insight but with a truism: The ways researchers understand academic and scientific communities and their texts as similar and different are shaped by the object, motives, and conditions of the research program undertaken.

If the goal is purely to develop linguistic analysis and theory, or to provide linguistic resources to students to pursue work in a linguistically specialized and relatively stable context of activity that the researchers understand well and teachers can control (e.g., air traffic control, secondary school history exams), then fine-grained linguistic analysis is useful. If students are highly motivated and homogeneous, then perhaps little more than a logical pedagogical sequence is necessary to arrive at target proficiency. One can use only the linguistic context (the other words), perhaps supplemented by a few brief interviews (Hyland, 2011).

If the goal of research is to provide critical perspective on the writing that teachers and students in higher education do, to make generalizations about the social and cultural situation broadly, then one can also read context from texts without systematic inquiry into context using para- or non-linguistic methods. As Slembrock (2005, 622) puts it, “CDA’s pivotal and privileged moment is that of the social–theoretical interpretation and explanation, and its projected unit of reference is ‘societal,’ broadly speaking, the stage of Late Modern/Advanced
capitalist societies.”

However, if the goal of research is understand the situation of learning in relation to texts and their production in order to create or evaluate pedagogical and other institutional interventions—programs—then the researcher must move beyond linguistic context to social context, understood in anthropological or sociological or other terms. And that is what much of the North American and UK research with which we are familiar has done, as well as much research on the continent under the rubric of didactics.

Finally, if the goal of research is to design and evaluate interventions to improve learning and writing—at a very deep level, both students and scientists are not only writing to communicate but also writing to learn—then one must look at the social psychological processes, the developmental trajectory of students/scientists as well as the linguistic targets, a social critique of schooling, or even ethnographic description of practices. The ways writing works beyond—and in interaction with—formal schooling and scientific research become important. And that has been the task of activity and genre approaches, and the reason this chapter began with a wide view of texts and communities.

Thus, the answer to our title question depends very much on the objects studied, and the motives for studying them. The heterodoxy of approaches to the question posed in the title does not mean at all that they are mutually exclusive. Learning from each other across disciplinary and geographic boundaries can produce useful cross-fertilization.
References


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Motta-Roth, D. 1998. Discourse analysis and academic book reviews: A study of text and


Figure 1. Some relationships among texts/genres and communities, academic non-academic, scientific and non-scientific

<table>
<thead>
<tr>
<th>Academic</th>
<th>Non-Academic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Formal Higher Education</strong></td>
<td><strong>Business, industry, government, non-profit sectors</strong></td>
</tr>
<tr>
<td><strong>Student genres</strong></td>
<td><strong>Intern genres</strong></td>
</tr>
<tr>
<td><strong>Educational genres:</strong> (student-written texts, textbooks, syllabi, manuals, commentary on student work, etc.)</td>
<td><strong>Non-scientific genres</strong> (bureaucratic, publicity, legal, popularized, journalistic, RFPs, etc.)</td>
</tr>
<tr>
<td><strong>Scientific genres by researchers in Formal Higher Education</strong></td>
<td><strong>Scientific genres by researchers outside formal educational institutions</strong></td>
</tr>
<tr>
<td><strong>Scientific journal articles, grant proposals, working papers, patents, etc.</strong></td>
<td><strong>Scientific journal articles, internal research reports, patents, “grey” literature, etc.</strong></td>
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