

Collaborating for Content and Language Integrated Learning

Interdisciplinarity as a Lens for Theorizing Language/Content Partnerships

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Abstract: The paper employs interdisciplinarity as a theoretical lens for describing meaningful content/language partnerships and establishing an ontology for such partnerships. Interdisciplinary collaboration, as defined by scholars, entails the integration of knowledge across domains and the clear valuing of all contributors in addressing an issue located at the intersection of multiple domains. The paper begins by reviewing the literature on modes of collaboration and definitions of interdisciplinarity to establish the theoretical framework. It then describes research on learning, including situated learning and metacognition, that highlights the need for teaching collaborations marked by interdisciplinary approaches. Finally, the paper examines the ways in which an interdisciplinary framework can mediate issues surrounding power and trust among content and language collaborators, and concludes by highlighting the ways in which interdisciplinary collaborations can occur in a variety of institutional structures.

I don't teach ...: The Dis-integration of Language and Content

"I don't teach writing."

In casual conversations and research studies, this phrase is ubiquitous in my conversations with engineering faculty about communication in their classrooms. "Writing" is something other people — people with English degrees — teach. Yet often these faculty require writing in their courses — in lab and project reports, but also on homework and tests where students must "work out" the answers, where mathematical and graphical representation are fundamental modes of engineering communication. Moreover, these faculty teach students about the methods, modes of reasoning, and forms of evidence that constitute disciplinary epistemologies and are embodied in disciplinary writing. What faculty mean, then, when they say they don't teach writing is that they don't teach grammar and mechanics. They don't name the parts of speech; they don't explain how to punctuate non-restrictive clauses; they don't teach organization; they don't teach transition words or topic sentences or thesis statements.

Engineering faculty are not unique; "I don't teach writing" recurs in conversations with faculty in the sciences, the social sciences, business, and beyond. Nor are language faculty immune. Many writing faculty "don't teach engineering" (or science or history or marketing). The disciplinary knowledge is outside their expertise and thus outside their pedagogy and outside their writing classrooms.

In an essay that served as a "think piece" for the colloquium where this paper was first presented, Mike Baynham "raise[d] the question about how the collaboration between language and disciplinary specialists should be located institutionally: should the language specialist be 'embedded' in a disciplinary department,

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in order to maximize interaction with discipline specialists, or located in a service unit or centre, or perhaps a combination of both?" (Baynham, 2010, p. 1). While location is important, the pervasiveness of "I don't teach ..." suggests that before location, we need to consider what I might call the ontology of the collaboration, its way of being.

"I don't teach ..." suggests a neat division between language and content. The phrase provides an escape clause for content experts who do teach students the modes of reasoning and evidence acceptable in their fields. For example, in materials science and engineering, where I teach, content faculty teach students how to read images taken by scanning electron microscopes, how to conduct experiments that vary processing conditions to manipulate material behavior, and how to interpret the resulting relationships. Such constructs constitute the evidence the field considers valid and the reasoning processes deemed acceptable; they are central to effective disciplinary communication. By abstracting themselves from "writing," content faculty divorce knowledge from the epistemological frameworks that underpin that knowledge and the discursive practices by which it is constructed.

At the same time, "I don't teach..." allows language experts to focus on writing style (use active voice; be concrete) and common genres (proposals, recommendation reports) as generalizable across domains. In the U.S., this approach is reflected in textbooks employed in technical writing courses. One of the most popular, Markel's *Technical Communication*, has chapters on a range of "writing" topics (e.g. writing collaboratively, researching, coherence, sentence style) and genres (e.g. proposals, formal reports, informal reports, instructions) (Markel, 2003). Lannon and Gurak's *Technical Communication* covers similar territory (Lannon & Gurak, 2010), as does Anderson's *Technical Communication: A Reader-Centered Approach* (Anderson, 2002) and many others. Yet as Wolfe points out in her analysis of twelve such books, this approach fails to meet the needs of students in engineering and the sciences (Wolfe, 2009). She notes, for example, that these texts "show a troubling lack of regard for the data, results, and numbers that are central to engineering work" (p. 367). That is, they do not address critical rhetorical moves associated with argument and evidence in these fields. "Writing" in the absence of "content" is divorced from the discourse structures that sustain the discipline.

This attempt to divorce language and content is countered by efforts towards their integration, including Academic Literacies (AL), writing across the curriculum (WAC), and writing in the disciplines (WID). AL draws on the work of Gee and New Literacy Studies as it emerged in the 1990s, treating academic disciplines as cultures whose distinct social, cultural, and epistemological frameworks are embodied in its discourse. As Lea and Street explain, AL treats "literacies as social practices [and] views student writing and learning as issues at the level of epistemology and identities rather than skill or socialization" (Lea & Street, 1998). Helping students learn to write involves making disciplinary epistemologies explicit and helping them navigate these epistemologies as they develop disciplinary identities. Though some WAC and WID pedagogies perpetuate the content/language divide, others draw on the work of Britton and Emig, which treats writing as a mode of learning, on pedagogical research that suggests that writing development requires repeated exposure in multiple contexts (Russell, 2002), and more recently on rhetorical genre studies and professional communication to situate writing. These and related approaches provide the context for the present discussion of Integrating Content and Language (ICL) in higher education.

Modes of Collaboration at the Disciplinary Crossroads

Despite 30 years of WAC/WID in the U.S. and 20 years of AL in the U.K. and Europe, the separation between language and content — discursively reified as "I don't teach..." — persists, and it is this persistence that leads me to consider the ontology of ICL collaboration. "I don't teach..." represents a mode of collaboration termed multidisciplinary, in which two or more disciplines independently address a common problem, but divide the work by domain expertise. No integration of the domains occurs, nor do the domain experts experience conceptual change through the collaboration (Committee on Facilitating

Interdisciplinary Research, National Academy of Sciences, National Academy of Engineering, & Medicine, 2005; J. T. Klein, 1990). This approach, colloquially termed "divide and conquer" suggests individuals in separate cubicles who toss their completed work "over the wall" to disconnected collaborators (O'Brien, Soibelman, & Elvin, 2003). In contrast, interdisciplinary collaborations emphasize integration of domains and intellectual engagement that changes the collaborators (Committee on Facilitating Interdisciplinary Research et al., 2005). In recent years, groups such as the U.S. National Academy of Sciences and the European Union Research Advisory Board have been advocating interdisciplinary approaches to research (Committee on Facilitating Interdisciplinary Research et al., 2005; European Union Research Advisory Board, 2001). In the U.S., this emphasis also encompasses the need to develop interdisciplinarity in students.

Although the terms multidisciplinary, interdisciplinary, and transdisciplinary are often used interchangeably by those describing projects that involve multiple disciplines, these distinctions, detailed by scholars such as Klein (J. T. Klein, 1990), Rosenfield (Rosenfield, 1992), Lattuca (Lattuca, 2002, 2003), Stokols (Stokols et al., 2003), and Boix Mansilla (Boix Mansilla, 2005; Boix Mansilla & Duraising, 2007; Boix Mansilla & Gardner, 2006), help theorize the collaboration between language and content experts and mitigate the "I don't teach..." mentality. Rosenfield, for example, distinguishes these modes based on the nature of the interactions (Rosenfield, 1992). In multidisciplinary collaborations, individuals work in isolation, addressing only work within their areas of expertise and 'handing off' their products to others. Interdisciplinary collaborations are marked by increased interdependence, with individuals working simultaneously on a shared problem, communicating throughout the project but remaining with their expertise domains. In transdisciplinary collaborations, individuals from different academic and non-academic domains integrate and expand their domain perspectives to achieve a shared conceptual framework that is more than the sum of the constituent parts.

Lattuca extends these definitions by describing a spectrum of interdisciplinarity developed from interviews with faculty engaged in interdisciplinary teaching and research (Lattuca, 2003, 2010). In *informed disciplinarity*, faculty address issues within their discipline but (as teachers) draw on examples from other fields to help students make connections or (as researchers) borrow methods from other fields to provide insights. *Synthetic interdisciplinarity* brings two or more disciplines together to address an issue situated at the intersection of disciplines. As both teachers and researchers, faculty represent their discipline's perspective on the issue but focus on dialogic connections across disciplines, and the issue remains at the intersection rather than within any one domain. The process emphasizes the integration of perspectives to achieve a more comprehensive understanding. *Transdisciplinarity* encompasses work that spans disciplinary and academic/community boundaries to address complex real-world problems through integrated conceptual frameworks. Finally, *conceptual interdisciplinarity* examines issues that lie between disciplines and incorporates multiple perspectives, but emphasizes a critical stance that explores both the contributions and the limitations of those perspectives.

Where Lattuca examines collaborations, Boix Mansilla examines interdisciplinary understanding at the individual level, described as "the capacity to integrate knowledge and modes of thinking from two or more disciplines to produce a cognitive advancement ... in ways that would have been unlikely through single disciplinary means" (Boix Mansilla, 2005, p. 16). She and her colleagues identify three critical dimensions of this understanding: disciplinary grounding (including content, methods, purpose, and genres), integration of disciplinary insights, and a self-critical stance that is intentional about the integrative process and aware of its benefits *and* limitations (Boix Mansilla, 2005; Boix Mansilla & Duraising, 2007).

My goal in highlighting these definitions is not to debate what constitutes "true" interdisciplinary work or suggest that one model of interdisciplinarity is "right" for ICL. Rather, I highlight the overarching conceptual framework they offer to a theory of ICL learning in terms of its goals and the questions of power and trust that surround these partnerships. Interdisciplinarity, as these definitions suggest, operates around shared goals that reside at the intersection of disciplinary boundaries, and collaborations are marked by epistemological openness and a recognition of the value of each perspective. By naming a theoretical

framework that shapes these collaborations, we create an intellectually grounded space for describing and enacting this work. Importantly, these definitions portray interdisciplinarity as both individual and collaborative, implying that it can operate in a range of institutional locations.

Shared Goals: Understanding Student Learning Through Situated and Meta-Cognitive Perspectives

Elsewhere colleagues and I have argued for interdisciplinarity as a lens to characterize partnerships between writing program administrators and content faculty in the U.S. (Paretti, McNair, Belanger, & Diana, 2009) that provides a basis for intellectual equity, institutional validation, and mutually beneficial collaborations. I extend that focus here by examining the goals of ICL and the relationship between interdisciplinary goals and learning theory.

In the version of this paper presented at the ICL colloquium, I delineated goals in terms of students' rhetorical development — their ability to succeed in individual writing tasks, but also, as AL suggests, their ability to develop a meta-knowledge about discourse practices that enable them to communicate successfully in different contexts. But during the colloquium, participant Karin Wolff reminded us that even as we explored ICL collaboration, we were not always clear about its goal. Her question illuminated the way in which, by claiming rhetorical development as "the goal," I had situated ICL learning not at the intersection of content and language, but rather within language. Even though as a language expert, I might intellectually position rhetorical development at the intersection of content and language, discursively I had positioned it within only one domain. For many content faculty, however, rhetorical development is not the primary goal; their focus is on students' mastery of domain knowledge. In engineering, for example, the accrediting body defines eleven student outcomes; one is "the ability to communicate effectively," but the remaining ten cover both content (e.g. "an ability to apply knowledge of math, science, and engineering") and professional practice (e.g. "an ability to function on multidisciplinary teams") (ABET Engineering Accreditation Commission 2007). Academic literacy may be a goal, but it may not be the only, or even the most important, goal in ICL learning. Instead, content and language experts may need to come together around broader questions of student development and in that shared commitment, locate the intersection where they co-construct a dynamic learning space. Such shared commitments are evident in the partnerships described by Lillis and Ray, Paxton, and Leibowitz in this volume (Lillis and Ray, 2011; Paxton, 2011; Leibowitz et al., 2011). In these studies, language use is embedded in the development of professional practices, and the projects describe learning goals that holistically address students' development as domain experts. Such approaches exemplify ICL partnerships in which content and language experts develop joint ownership of shared, mutually beneficial goals for student learning.

Within learning research, studies suggest two frameworks useful for ICL partnerships: situated cognition and metacognition. Situated cognition negates the separation of content and context by suggesting that the acquisition of knowledge cannot be separated from application of that knowledge in particular use contexts (e.g., Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991; Wenger, 1998). Situated cognition argues that individuals do not effectively learn facts or concepts — grammatical rules, paragraph structures, mathematical formulas, scientific principles — in abstraction, apart from how those concepts are applied in a given field. Such research has in turn led to a variety of learning models, including cognitive apprenticeship (Brown et al., 1989), legitimate peripheral participation (Lave & Wenger, 1991), and communities of practice (Wenger, 1998). These approaches share a commitment to connecting content to use by engaging learners in authentic activities in which they apply concepts being learned to tasks associated with those concepts in professional practice.

As Brown et al. note, the earliest work in situated cognition emerged vis-à-vis language: students who memorized abstracted definitions of vocabulary words could repeat the definitions but could not use those words in meaningful sentences (Brown et al., 1989). Citing Miller and Gildea, they highlight examples such

as "Me and my parents correlate because without them I wouldn't be here" (p. 32). What is true at the level of the word is also true at higher levels of rhetorical development. Scholars such as Adams, Dias, Freedman, Medway and Pare. (P. Dias, Freedman, Medway, & Pare, 1999; Patrick Dias, 2000; Freedman & Adam, 1996, 2000), Artemeva (Artemeva, 2007, 2008; Artemeva, Logie, & St-Martin, 1999), Dannels (Dannels, 2000, 2003), Russell (Russell, 1997a, 1997b), and others have combined situated cognition with rhetorical genre theory and activity systems to explore learning to write as a situated activity. While accepted rules of grammar are approximately constant across settings, constructs such as tone, organizational structure, evidence, and reasoning all shift as discourse communities change. Research indicates that patterns learned in one arena do not inherently transfer to new arenas, a perspective that resonates with Lea and Street's work on AL (Lea & Street, 1998). And situated cognition applies not only to rhetorical development; students engaged in mastering engineering or math or business also require situated activities — including communicative practices — to create meaningful contexts.

At the same time, metacognition (the ability to monitor one's own learning) and the ability to situate new concepts within an articulated conceptual framework have also emerged as critical to knowledge transfer (Bransford, Brown, R., Donovan, & Pellegrino, 2000). For example, as students develop the ability to communicate in one context, understanding the larger conceptual frameworks (e.g. the rhetorical triangle, genre, visual design principles) and developing a meta-awareness of their progress supports their ability to communicate effectively in another context. Research in writing studies, even when not explicitly applying these theories, supports these principles, as evidenced by the work of Artemeva (Artemeva, 2007), Ford (Ford, 2004), and Jarrett et al. (Jarrett, Mack, Sartor, & Watson, 2009), among others. Such studies indicate that as students develop a language to talk about communication, they are more effective at both transferring writing skills across contexts and recognizing transfer as it occurs. At the same time, much of the research on writing to learn highlights writing as a mechanism for supporting metacognitive processing in content domains (Bangert-Drowns, Hurley, Wilkinson, Monmouth, & University at Albany, 2004; Emig, 1977; P. D. Klein, 1999). As with situated learning, meta-cognition clears a space for ICL partnerships as mutually constitutive learning environments.

Interdisciplinarity in ICL Learning

I highlight situated and meta-cognition here because they suggest that interdisciplinarity is essential in ICL partnerships. It is certainly essential for rhetorical development, which remains a key goal for language experts, if not the only goal for ICL collaborations. Content experts bring domain knowledge of the discipline as well as a working knowledge of the rhetorical and epistemological structure of the field. They know how truth claims are substantiated, how information is represented visually and verbally, and what forms of argument support knowledge construction. They may also be adept at communicating disciplinary knowledge to non-experts to influence decision-making. But often this knowledge is tacit: content experts can name their domain knowledge but may not have words to name their rhetorical knowledge (Jacobs, 2007, 2010; Lea & Street, 1998; Leydens, 2008). They rely on ambiguous terms like "flow," and "logic" to describe gaps in student writing, but lack language to define those terms in ways that help students establish the necessary conceptual framework.

In contrast, language experts understand both the syntactic structures of their native language and the rhetorical structures that underlie communication — mechanisms of persuasion, organizational patterns, social functions of genres, rhetorical turns. They have conceptual frameworks to describe the ways in which communication is context-dependent and they can identify the relationships between rhetorical structures and disciplinary epistemologies. Such knowledge, in turn, helps both students and content faculty develop the metacognitive awareness needed for transfer. What language faculty often lack, however, is the rich understanding of disciplinary and workplace norms that are central to situated cognition.

Thus content experts have tacit knowledge about disciplinary communication that supports situated cognition, and language experts have a vocabulary for articulating that knowledge in ways that support metacognition. An interdisciplinary framework that integrates both domains offers an ideal approach to rhetorical development. It enables language experts to understand the rhetorical structures of disciplines that instantiate the conceptual frameworks of language learning (e.g. genre theory, rhetoric) within the authentic contexts in which students must perform. At the same time, it enables content experts to access the conceptual frameworks that underlie successful communication and develop a language for providing students with meaningful instruction and feedback.

However, as noted above, rhetorical development cannot be the only goal in an interdisciplinary partnership. Interdisciplinary collaboration can and should also support content learning, as suggested by writing-to-learn pedagogies. Here content experts again have domain knowledge, along with a strong understanding of learning goals, while language experts have pedagogical strategies that use writing (or other modes, including visual and multimodal) to support those learning goals. Moreover, work by Brammer and her colleagues suggest that, at least in U.S. contexts, this attention to both content and language goals may be essential to the success of ICL partnerships (Brammer, Amare, & Campbell, 2008).

Power and Trust In ICL Collaborations

As noted earlier, interdisciplinarity offers a way to examine not only shared goals, but also issues of power and trust in ICL collaborations. Work by Jacobs has been particularly useful in understanding the role of power among ICL partners (Jacobs, 2007, 2010). Jacobs' study of collaborations among content and language lecturers provides a set of characteristics for successful partnerships that neatly intersect the constructions of interdisciplinarity posited by Lattuca, Boix-Mansilla, and others. For example, her descriptions of the centrality of shared goals strongly echoes the formulations described and matches the findings of similar studies in U.S. collaborations (Brammer, Amare, & Campbell, 2008).

At the same time, Jacobs' work highlights the ways in which perceptions of unequal power relations can negatively impact collaborators' trust and thus the success of the partnership (Jacobs, 2007, 2010). In the cases she studied, power imbalances emerged when the language expert, who brought broad pedagogical expertise, was perceived as dominant or overreaching. In U.S. contexts, the imbalance often operates in the opposite direction, with content faculty devaluing the expertise brought by language experts. Writing is often seen as a service course or an activity that "anyone" can teach, and ICL partnerships can be characterized by intellectual inequities resulting in distrust or devaluation.

In such cases, invoking interdisciplinarity can recast the tenor of a discussion by foregrounding the necessary and valuable contributions of the disciplinary partners with respect to a goal that lies between domains. When neither side claims ownership and both partners recognize and articulate the value of one another's perspectives, the power imbalance can begin to be challenged, if not readily dismantled. In highlighting this potential, however, it is essential to note Chrissie Boughey's insightful critique offered at the ICL colloquium. As the respondent to the first session of the colloquium, 'Theorising ICL collaborations', Boughey raised essential questions about the context in which this potential exists. While interdisciplinarity offers a useful frame for understanding ICL partnerships at the individual level, she reminded us that larger macro structures — departmental, institutional, and cultural — impinge powerfully on ICL learning in ways that can either engage or destroy interdisciplinary possibilities.

Interdisciplinarity Enacted: Structures of ICL Collaborations

With interdisciplinarity as a framework for ICL collaboration, I want to conclude by returning to Baynham's question about location. Interdisciplinarity, as described here, does not inherently demand an ongoing team-teaching approach. Approaches in which content and language faculty enter into visible partnerships

to integrate these domains for students are certainly one successful approach (J. L. Craig, Lerner, & Poe, 2008; N. Craig, Thompson, Donath, & Matthews, 2005; Hirsch & Shwom, 2000; Hirsch et al., 2001; Shwom, Hirsch, Yarnoff, & Anderson, 1999; Yalvac, Smith, Troy, & Hirsch, 2007). Central to the success of these approaches, however, is not simply the physical presence of two different faculty members. It is the development of interdisciplinary understanding among all collaborating faculty as they learn to speak one another's language and provide students with an integrated view of disciplinary communication. Such is the case in Leibowitz et al.'s work with students in social work, occupational therapy, and psychology (Leibowitz et al., 2011). At the same time, team-teaching is not the only vehicle for interdisciplinarity. For example, Patton's work with civil engineering (Patton, 2008) and Thaiss and Zawacki's work across disciplines (Thaiss & Zawacki, 2006; Zawacki & Gentemann, 2009) provide examples of ways in which interdisciplinary understanding develops through collaborations outside the classroom to support content faculty working in their classrooms. Such collaborations are still marked by learning on both sides as language faculty developed richer understandings of the disciplines while disciplinary faculty developed richer understandings of language teaching and learning. Alternately, the focus can shift from the integration of language learning into disciplinary courses to the integration of disciplinary norms into language courses, in which the language faculty work closely with content faculty to develop an understanding of rhetorical contexts and needs that can be applied within the language classes themselves (e.g., Ballentine, 2008; Leydens & Schneider, 2009).

Interdisciplinarity, then, provides a conceptual framework for considering how content and language experts might collaborate to address issues at their intersection: student learning vis-as-vis both rhetorical and domain expertise. Developing interdisciplinary understanding within individual faculty and creating interdisciplinary collaborations among them enables us to move beyond "I don't teach..." and embrace ICL independent of the institutional structures. It demands cognitive flexibility and intellectual engagement, but it also enables us to set the terms of ICL partnerships in ways that can best support student learning in each local context. By providing a rich intellectual space for students and faculty alike, interdisciplinarity creates a space in which we can all continue to learn. Such space, however, as Boughey noted, demands an institutional and cultural moment in which to thrive.

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