

Points of Reference in Technical Communication Scholarship

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Identified in this article are 163 texts selected from a database of over 25,000 citations collected from five technical communication journals between 1988 and 1997. The texts—points of reference—represent the research, theory, and practice of technical communication.

In this article, 163 texts—points of reference—are identified as representative of the research, theory, and practice that support technical communication scholarship. The points of reference provide an overview of technical communication's body of knowledge and the conversations of the discipline between 1988 and 1997. They are the most frequently cited texts culled from a database of more than 25,000 citations. The underlying assumption is that the authors of the points of reference have influenced the authors publishing the conversations of the discipline. The points of reference illustrate the evolution and knowledge-building activities of technical communication. Comparing the texts provides observations about the topics, authors, and forums of technical communication scholarship over the ten years.

Identifying the topics calls attention to the problems technical communication scholars and practitioners work on and solve. The topics are broadly defined as the professional issues surrounding the pedagogy, research, and definition of technical communication; rhetoric and the rhetorics of communities; document design and technology; and workplace communication. The analysis presented here reveals shifts in the topics over the ten years of this study. Rhetoric and, for example, discussions of the rhetoric of visuals have become more prominent in our scholarship and composition theory has become less influential. However, the analysis also reveals the constancy of discussion on ethics and the responsibility of the teacher to

develop an awareness in students of the ethical issues technical communicators encounter. Reviewing the topics covered by the points of reference identifies areas of research in technical communication.

Identifying the authors recognizes those contributing to and influencing technical communication scholarship. One of the most noticeable and heartening observations is the diversity of the disciplines and activities represented by the authors. Mixed among the authors active in technical communication as evidenced by their other roles (for example, Mary Lay and Elizabeth Tebeaux, past presidents of ATTW, or Jimmie Killingsworth, former editor of the ATTW Contemporary Series) are authors who cross disciplinary boundaries—for example, Carol Gilligan, Edward T. Hall, Thomas Kuhn, and Jean-Francois Lyotard—and authors who have strong workplace connections, for example, William Horton and Peter Senge. This study of the authors also yielded two observations that may warrant action: (1) teams of authors are publishing fewer articles in technical communication and (2) the proportion of male authors to female authors does not parallel the proportion of male to female scholars or practitioners.

Identifying the forums establishes the setting for the conversations of technical communication professionals. The forums for the 163 texts include journals, anthologies, and books. The forums cited have changed over the ten-year span. For example, the number of points of references published in technical communication-specific forums has increased to suggest a strengthening of these forums. And, the number of points of references published as books indicates discussions of topics significant enough to warrant a book-length forum. The forums are important because they publish the conversations of members of the technical communication community, and they also present the scholarship publicly to other communities.

Few citation studies from any field use a database with more than 25,000 citations (Borgman). N. Lamar Reinsch and his co-authors Phillip Lewis and Janet Reinsch have studied citation patterns for the *Journal of Business Communication* and for selected business and technical communication journals, but they worked with a fewer number of citations. Priscilla Rogers reports on the Research Think Tank at the 1994 Association for Business Communication International Conference. The Research Think Tank developed a list of 75 sources the participants identified as influential to their research. Mary Sue MacNealy has studied a comparable number of texts in her analysis of the International Technical Communication Conference (ITCC) Proceedings ("Moving"; "Research"). Additionally, the scope of bibliographic studies completed by Karen Schriver and William Rivers contribute similar, large-scale analyses of technical communication scholarship.

The 163 points of reference provide a representative set of texts that describe technical communication scholarship. In the first part of this article, I describe the bibliometric method of citation analysis and

present the 163 points of reference. In the second part of the article, I present observations about the topics, the authors, and the forums represented by the texts. My primary purpose is to introduce the points of reference and make some observations. The observations only begin to describe the points of reference and scholarly activities in technical communication.

Data Collection: Citation Analysis

The bibliometric method of citation analysis was used to identify the points of reference. The citation represents an intertextual connection that places the author's study among studies by others (Bazerman; Porter). The author establishes the context for his or her inquiry, in part, by identifying the texts of other authors.

The problem with citation research in technical communication is identifying cited texts. Indexes such as the *Arts & Humanities Citation Index*, *Social Sciences Citation Index (SSCI)*, and the *Science Citation Index* are the databases for most studies using citation analysis. However, only two of the five technical communications journals from this study, *IEEE Transactions on Professional Communication* and the *Journal of Technical Writing and Communication*, are indexed in the same citation index, SSCI. The only sources for complete citation information are the professional journals. As Dale Sullivan illustrates, journals display disciplinarity. For these reasons, I collected the citations directly from the Works Cited and Reference sections of the refereed articles and selected introductions to special issues and editorials published in five technical communication journals between 1988 and 1997:

IEEE Transactions on Professional Communication (IEEE)
Journal of Business and Technical Communication (JBTC)
Journal of Technical Writing and Communication (JTWC)
Technical Communication (TC)
Technical Communication Quarterly (TCQ) (formerly *The Technical Writing Teacher [TWT]*)

Over 25,000 citations were collected from two five-year periods, 1988 through 1992 (Set I) and 1993 through 1997 (Set II). At the time of the original collection in 1993, a five-year period provided a significant number of citations to study and all five journals were represented. The points of reference identified in this study represent 163 texts, or 6.78% of the ten-year set of citations collected. (See Smith, "Forums" and "Strength," for more detailed descriptions of the data collection process.)

Each reference cited carries equal weight whether it signals a direct quote or paraphrase from a source or is simply one of several references listed in a review of literature statement. Two groups of citations were set aside. Citations from bibliographies and regular

features such as "Recent and Relevant" in TC or "Approaches and Practices" in JBTC were not collected, and citations referring to textbooks, the texts of classical theorists such as Aristotle and Plato, and texts published before the 1900s were collected but are not included in this study. Eliminating the textbooks reduced the database to a more manageable size and kept the focus of the study on research and theoretical developments rather than pedagogy. However, several of the texts identified as points of reference are used as texts in undergraduate and graduate classrooms and in corporate training programs (for example, Horton's *Designing and Writing Online Documentation* or John Brockmann's *Writing Better Computer User Documentation*).

Special sections and issues of journals weight the results toward the emphasized topic, but this attention also indicates the topics important to technical communication professionals. For example, the citations for several articles, particularly MacNealy's studies of ITCC proceedings ("Moving"; "Research") and Schriver's review essay of document design issues, far exceed the average number of citations per article thus giving weight to the topics of their essays.

To identify the texts, I sorted the citations by cited author and narrowed the set of texts to a manageable, representative sample. Self-references were not included and multiple references by the citing author to cited authors were counted only once to lessen the effect of self-promotion and admiration by a particular author for another. These were arbitrary decisions, but ones aimed at recognizing the dispersion of a text across the profession. No consistent guidelines exist for what is considered acceptable or excessive self-citing (MacRoberts and MacRoberts); however, I assume that multiple references by the same author reflect influence only on that author and not influences across the community. Selecting texts cited six or more times captured 78 of the texts in Set I and 116 in Set II or 20% of the texts cited three or more times from the entire set of citations from each time period. When combined, the two sets consist of 163 texts (31 texts appear in both sets)—a manageable, representative sample.

The 163 points of reference are identified in Table 1. The texts are listed in alphabetical order to give each entry equal representation even though some texts are cited more frequently than others. In a few cases, the names of authors and co-authors were adjusted for consistency in referring to the author. The X in the first column indicates the text was cited frequently between 1988 and 1992 (Set I), the X in the second column, between 1993 and 1997 (Set II). The lines beside each pair of texts by Brockmann, Horton, Theodor Nelson, and E. H. Weiss indicate that the two texts by each author are counted as one. In each case the more recently published text represents a significantly revised edition of the earlier, but a revision not significant enough to warrant separate recognition as a frequently cited text.

Table 1

Points of Reference. The texts frequently cited in five technical communication journals: Set I — 1988-1992 and Set II — 1993-97.

I	II	Text
	X	Allen, Jo. "Gender Issues in Technical Communication Studies." <i>JBTC</i> 5 (1991): 371-92.
X	X	Allen, Nancy, Dianne Atkinson, Meg Morgan, Teresa Moore, and Craig Snow. "What Experienced Collaborators Say about Collaborative Writing." <i>JBTC</i> 1 (1987): 70-90.
X	X	Anderson, Paul V. "What Survey Research Tells Us about Writing at Work." <i>Writing in Nonacademic Settings</i> . Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 3-83.
X		Anderson, Paul V., R. John Brockmann, and Carolyn R. Miller, eds. <i>New Essays in Technical and Scientific Communication: Research, Theory, Practice</i> . Farmingdale, NY: Baywood, 1983.
	X	Anson, Chris M., and L. Lee Forsberg. "Moving Beyond the Academic Community." <i>WC</i> 7 (1990): 200-31.
X		Atlas, Marshall A. "The User Edit: Making Manuals Easier to Use." <i>IEEE</i> 24 (1981): 28-29.
	X	Bakhtin, M. M. <i>The Dialogic Imagination</i> . Ed. Michael Holquist. Trans. Caryl Emerson and Michael Holquist. Austin: U of Texas P, 1981.
	X	Barabas, Christine. <i>Technical Writing in a Corporate Culture: A Study of the Nature of Information</i> . Norwood, NJ: Ablex, 1990.
X		Barton, Ben F., and Marthalee S. Barton. "Simplicity in Visual Representation: A Semiotic Approach." <i>JBTC</i> 1 (1987): 9-26.
X		Bazerman, Charles. "Scientific Writing as a Social Act: A Review of the Literature of the Sociology of Science." <i>New Essays in Technical and Scientific Communication: Research, Theory, Practice</i> . Ed. Paul V. Anderson, R. John Brockmann, and Carolyn R. Miller. Farmingdale, NY: Baywood, 1983. 156-84.
X	X	Bazerman, Charles. <i>Shaping Written Knowledge: The Genre and Activity of the Experimental Article in Science</i> . Madison: U of Wisconsin P, 1988.
	X	Bazerman, Charles, and James Paradis, eds. <i>Textual Dynamics of the Professions: Historical and Contemporary Studies of Writing in Professional Communities</i> . Madison: U of Wisconsin P, 1991.
	X	Beard, John D., Jone Rymer, and David L. Williams. "An Assessment System for Collaborative-Writing Groups: Theory and Empirical Evaluation." <i>JBTC</i> 3 (1989): 29-51.
X	X	Belenky, Mary F., Blythe M. Clinchy, Nancy R. Goldberger, and Jill M. Tarule. <i>Women's Ways of Knowing: The Development of Self, Voice, and Mind</i> . New York: Basic Books, 1986.
X		Benson, Philippa J. "Writing Visually: Design Considerations in Technical Publications." <i>TC</i> 32 (1985): 35-39.
X		Bernhardt, Stephen. "Seeing the Text." <i>CCC</i> 37 (1986): 66-78.
X		Bethke, Frederick J. "Measuring the Usability of Software Manuals." <i>TC</i> 30 (1983): 13-16.
	X	Bolter, Jay David. <i>Writing Space: The Computer, Hypertext, and the History of Writing</i> . Hillsdale: Erlbaum, 1991.
	X	Bosley, Deborah. "Cross-Cultural Collaboration: Whose Culture Is It, Anyway?" <i>TCQ</i> 2 (1993): 51-62.
X		Bransford, John D., and Marcia K. Johnson. "Contextual Prerequisites for Understanding: Some Investigations of Comprehension and Recall." <i>J of Verbal Learning and Verbal Behavior [J of Memory and Language]</i> 11 (1972): 717-26.
X	X	Broadhead, Glenn J., and Richard C. Freed. <i>Variables in Composition: Process and Product in a Business Setting</i> . Carbondale, IL: Southern Illinois UP, 1986.

I	II	Text
X		Brockmann, R. John. <i>Writing Better Computer User Documentation: From Paper to Hypertext</i> . New York: Wiley, 1990.
X	X	Brockmann, R. John. <i>Writing Better Computer User Documentation: From Paper to Online</i> . New York: Wiley-Interscience, 1986.
X	X	Brown, Robert L., and Carl G. Herndl. "An Ethnographic Study of Corporate Writing: Job Status as Reflected in Written Text." <i>Functional Approaches to Writing: Research Perspectives</i> . Ed. Barbara Couture. London: Frances Pinter, 1986. 11-28.
X	X	Bruffee, Kenneth. "Collaborative Learning and the 'Conversation of Mankind.'" <i>CE</i> 46 (1984): 635-52.
X	X	Bruffee, Kenneth. "Social Construction, Language, and the Authority of Knowledge: A Bibliographical Essay." <i>CE</i> 48 (1986): 773-90.
X		Buehler, Mary Fran. "Defining Terms in Technical Editing: The Levels of Edit as a Model." <i>TC</i> 28 (1981): 10-14.
X		Burnett, Rebecca E. "Conflict in Collaborative Decision-Making." <i>Professional Communication: The Social Perspective</i> . Ed. Nancy Roundy Blyler and Charlotte Thralls. Newbury Park, CA: Sage, 1993.
X		Burnett, Rebecca E. "Substantive Conflict in a Cooperative Context: A Way to Improve the Collaborative Planning of Workplace Documents." <i>TC</i> 38 (1991): 532-39.
X		Carroll, John M. <i>The Nurnberg Funnel: Designing Minimalist Instructions for Practical Computer Skills</i> . Cambridge, MA: MIT P, 1990.
X		Conklin, James. "Hypertext: An Introduction and Survey." <i>Computer</i> 20 (1987): 17-41.
X		Connors, Robert J. "Technical Writing Instruction in America." <i>JTWC</i> 12 (1982): 329-52.
X		Cooper, Marilyn M. "The Ecology of Writing." <i>CE</i> 48 (1986): 364-75.
X	X	Couture, Barbara, and Jone Rymer. "Discourse Interaction between Writer and Supervisor: A Primary Collaboration in Workplace Writing." <i>Collaborative Writing in Industry: Investigations in the Theory and Practice</i> . Ed. Mary M. Lay and William M. Karis. Amityville, NY: Baywood, 1991. 87-108.
X		Couture, Barbara, and Jone Rymer. "Interactive Writing on the Job: Definitions and Implications of 'Collaboration.'" <i>Writing in the Business Professions</i> . Ed. Myra Kogen. Urbana, IL: NCTE, 1989. 73-93.
X		Deal, Terrence E., and Allan A. Kennedy. <i>The Corporate Culture: The Rites and Rituals of Corporate Life</i> . Reading, MA: Addison-Wesley, 1982.
X		Debs, Mary Beth. "Recent Research on Collaborative Writing in Industry." <i>TC</i> 38 (1991): 476-84.
X	X	Dobrin, David N. "What's Technical about Technical Writing." <i>New Essays in Technical and Scientific Communication: Research, Theory, Practice</i> . Ed. Paul V. Anderson, R. John Brockmann, and Carolyn R. Miller. Farmingdale, NY: Baywood, 1983. 227-50.
X	X	Dobrin, David N. <i>Writing and Technique</i> . Urbana, IL: NCTE, 1989.
X	X	Doheny-Farina, Stephen. "Writing in an Emerging Organization." <i>WC</i> 3 (1986): 158-85.
X	X	Doheny-Farina, Stephen, and Lee Odell. "Ethnographic Research on Writing." <i>Writing in Nonacademic Settings</i> . Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 503-35.
X		Dombrowski, Paul M. "Challenger and the Social Contingency of Meaning: Two Lessons for the Technical Communication Classroom." <i>TCQ</i> 1 (1992): 73-86.
X		Dumas, Joseph S., and Janice C. Redish. <i>A Practical Guide to Usability Testing</i> . Norwood, NJ: Ablex, 1993.
X	X	Ede, Lisa, and Andrea Lunsford. "Audience Addressed/Audience Invoked: The Role of Audience in Composition Theory and Pedagogy." <i>CCC</i> 35 (1984): 155-71.

I	II	Text
X	X	Ede, Lisa, and Andrea Lunsford. <i>Singular Texts/Plural Authors: Perspectives on Collaborative Writing</i> . Carbondale, IL: Southern Illinois UP, 1990.
	X	Emig, Janet. <i>The Composing Processes of Twelfth Graders</i> . NCTE Research Report no. 13. Urbana: NCTE, 1971.
X	X	Faigley, Lester. "Nonacademic Writing: The Social Perspective." <i>Writing in Nonacademic Settings</i> . Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 231-80.
X	X	Faigley, Lester, and Thomas Miller. "What We Learn from Writing on the Job." <i>CE</i> 44 (1982): 557-69.
X		Felker, Daniel B., ed. <i>Document Design: A Review of the Relevant Research</i> . Washington, DC: American Institutes for Research, 1980.
X		Felker, Daniel B., Frances Pickering, Veda R. Charrow, V. Melissa Holland, and Janice C. Redish. <i>Guidelines for Document Designers</i> . Washington, DC: American Institutes for Research, 1981.
X		Fish, Stanley. <i>Is There a Text in This Class? The Authority of Interpretive Communities</i> . Cambridge, MA: Harvard UP, 1980.
X		Flower, Linda, and John Hayes. "The Cognition of Discovery: Defining a Rhetorical Problem." <i>CCC</i> 31 (1980): 21-32.
X	X	Flower, Linda, and John Hayes. "A Cognitive Process Theory of Writing." <i>CCC</i> 32 (1981): 365-87.
X		Flower, Linda, John R. Hayes, and Heidi Swarts. "Revising Functional Documents: The Scenario Principle." <i>New Essays in Technical and Scientific Communication: Research, Theory, Practice</i> . Ed. Paul V. Anderson, R. John Brockmann, and Carolyn R. Miller. Farmingdale, NY: Baywood, 1983. 41-58.
X	X	Flower, Linda, John R. Hayes, Linda Carey, Karen Schriver, and James Stratman. "Detection, Diagnosis, and the Strategies of Revision." <i>CCC</i> 37 (1986): 16-55.
X		Forman, Janis, and Patricia Katsky. "The Group Report: A Problem in Small Group or Writing Processes?" <i>JBC</i> 23 (1986): 23-35.
X		Freed, Richard C., and Glenn J. Broadhead. "Discourse Communities, Sacred Texts, and Institutional Norms." <i>CCC</i> 38 (1987): 154-65.
X		Geertz, Clifford. <i>The Interpretation of Cultures</i> . New York: Basic Books, 1973.
X		Geertz, Clifford. <i>Local Knowledge</i> . New York: Basic Books, 1983.
X		Gilbert, G. Nigel, and Michael Mulkay. <i>Opening Pandora's Box: A Sociological Analysis of Scientists' Discourse</i> . Cambridge, UK: Cambridge UP, 1984.
X		Gilligan, Carol. <i>In a Different Voice: Psychological Theory and Women's Development</i> . Cambridge: Harvard UP, 1982.
X		Gross, Alan G. <i>The Rhetoric of Science</i> . Cambridge: Harvard UP, 1990.
X		Hall, Edward T. <i>Beyond Culture</i> . New York: Doubleday, 1976.
X		Hall, Edward T., and Mildred Reed Hall. <i>Understanding Cultural Differences</i> . Yarmouth: Intercultural P, 1990.
X		Halloran, S. Michael. "Technical Writing and the Rhetoric of Science." <i>JTWC</i> 8 (1978): 77-88.
X		Halloran, S. Michael, and Annette Norris Bradford. "Figures of Speech in the Rhetoric of Science and Technology." <i>Essays on Classical Rhetoric and Modern Discourse</i> . Ed. Robert J. Connors, Lisa S. Ede, and Andrea A. Lunsford. Carbondale, IL: Southern Illinois UP, 1984. 179-92.
X	X	Harrison, Teresa M. "Frameworks for the Study of Writing in Organizational Contexts." <i>WC</i> 4 (1987): 3-23.
X		Hartley, James. <i>Designing Instructional Text</i> . 2nd ed. New York: Nichols, 1985.
X	X	Hayes, John R., Linda Flower, Karen A. Schriver, James F. Stratman, and Linda Carey. "Cognitive Processes in Revision." <i>Advances in Applied Psycholinguistics: Vol. 2: Reading, Writing, and Language Learning</i> . Ed. Sheldon Rosenberg. New York: Cambridge UP, 1987. 176-240.

I	II	Text
X		Hayhoe, George F., Freda Stohrer, Lawrence D. Kunz, and Sherry G. Southard. Guest Editorial. "The Evolution of Academic Programs in Technical Communication." <i>TC</i> 41 (1994): 14-19.
X		Herndl, Carl, Barbara Fennell, and Carolyn Miller. "Understanding Failures in Organizational Discourse: The Accident at Three Mile Island and the Shuttle Challenger Disaster." <i>Textual Dynamics of the Professions</i> . Ed. Charles Bazerman and James Paradis. Madison: U of Wisconsin P, 1991. 279-305.
X		Hoft, Nancy L. <i>International Technical Communication: How to Export Information about High Technology</i> . New York: Wiley, 1995.
X		Horton, William. "The Almost Universal Language: Graphics for International Documents." <i>TC</i> 40 (1993): 682-93.
X		Horton, William. <i>Designing and Writing Online Documentation: Help Files to Hypertext</i> . New York: Wiley, 1990.
X		Horton, William. <i>Designing and Writing Online Documentation: Hypermedia for Self-Supporting Products</i> . 2nd ed. New York: Wiley, 1994.
X		Horton, William. <i>Illustrating Computer Documentation: The Art of Presenting Information Graphically on Paper and Online</i> . New York: Wiley, 1991.
X		Horton, William. "Is Hypertext the Best Way to Document Your Product? An Essay for Designers." <i>TC</i> 38 (1991): 20-32.
X		Huckin, Thomas. "A Cognitive Approach to Readability." <i>New Essays in Technical and Scientific Communication: Research, Theory, Practice</i> . Ed. Paul V. Anderson, R. John Brockmann, and Carolyn R. Miller. Farmingdale, NY: Baywood, 1983. 90-108.
X		Just, Marcel A., and Patricia A. Carpenter. <i>The Psychology of Reading Language Comprehension</i> . Boston: Allyn and Bacon, 1987.
X		Katz, Stephen B. "The Ethic of Expediency: Classical Rhetoric, Technology, and the Holocaust." <i>CE</i> 54 (1992): 255-75.
X	X	Killingsworth, M. Jimmie, and Betsy Jones. "Division of Labor or Integrated Teams: Management Crux." <i>TC</i> 36 (1989): 210-21.
X		Killingsworth, M. Jimmie, and Jacqueline S. Palmer. <i>Ecospeak: Rhetoric and Environmental Politics in America</i> . Carbondale: Southern Illinois UP, 1992.
X		Killingsworth, M. Jimmie, and Michael K. Gilbertson. <i>Signs, Genres, and Communities in Technical Communication</i> . Amityville, NY: Baywood, 1992.
X		Kinneavy, James L. <i>A Theory of Discourse: The Aims of Discourse</i> . New York: Norton, 1971.
X		Kintsch, Walter, and Teun A. van Dijk. "Toward a Model of Text Comprehension and Production." <i>Psychological Review</i> 85 (1978): 363-94.
X		Kleimann, Susan D. "The Complexity of Workplace Review." <i>TC</i> 38 (1991): 520-26.
X	X	Kuhn, Thomas S. <i>The Structure of Scientific Revolutions</i> . 2nd ed. Chicago: U of Chicago P, 1970.
X		Lakoff, George, and Mark Johnson. <i>Metaphors We Live By</i> . Chicago: U of Chicago P, 1980.
X		Latour, Bruno. <i>Science in Action: How to Follow Scientists and Engineers through Society</i> . Cambridge: Harvard UP, 1987.
X		Latour, Bruno, and Steve Woolgar. <i>Laboratory Life: The Social Construction of Scientific Texts</i> . Beverly Hills: Sage, 1979.
X	X	Lauer, Janice M., and J. William Asher. <i>Composition Research: Empirical Designs</i> . New York: Oxford UP, 1988.
X		Lay, Mary M. "The Androgynous Collaborator: The Impact of Gender Studies on Collaboration." <i>New Visions of Collaborative Writing</i> . Ed. Janis Foreman. Portsmouth, NH: Boynton/Cook, 1992. 82-104.

I	II	Text
X		Lay, Mary M. "Feminist Theory and the Redefinition of Technical Communication." <i>JBTC</i> 5 (1991): 348-70.
X	X	Lay, Mary M. "Interpersonal Conflict in Collaborative Writing: What We Can Learn from Gender Studies." <i>JBTC</i> 3 (1989): 5-28.
X		Lay, Mary M., and William M. Karis, eds. <i>Collaborative Writing in Industry: Investigations in the Theory and Practice</i> . Amityville, NY: Baywood, 1991.
X		Limaye, Mohan R., and David A. Victor. "Cross-Cultural Business Communication Research: State of the Art and Hypotheses for the 1990s." <i>JBC</i> 28 (1991): 277-99.
X		Lipson, Carol. "A Social View of Technical Writing." <i>JBTC</i> 2 (1988): 7-20.
X		Lunsford, Andrea, and Lisa Ede. "Why Write . . . Together: A Research Update." <i>Rhetoric Review</i> 5 (1986): 71-81.
X		Lyotard, Jean-Francois. <i>The Postmodern Condition: A Report on Knowledge</i> . Trans. Geoff Bennington and Brian Massumi. Minneapolis: U of Minnesota P, 1984.
X		MacKinnon, Jamie. "Becoming a Rhetor: Developing Writing Ability in a Mature, Writing-Intensive Organization." <i>Writing in the Workplace: New Research Perspectives</i> . Ed. Rachel Spilka. Carbondale: Southern Illinois UP, 1993. 41-55.
X		Markel, Mike. "An Ethical Imperative for Technical Communicators." <i>IEEE</i> 36 (1993): 81-86.
X	X	Miller, Carolyn R. "Genre as Social Action." <i>Quarterly J of Speech</i> 70 (1984): 151-67.
X	X	Miller, Carolyn R. "A Humanistic Rationale for Technical Writing." <i>CE</i> 40 (1979): 610-17.
X		Miller, Carolyn R. "Invention in Technical and Scientific Discourse: A Prospective Survey." <i>Research in Technical Communication: A Bibliographic Sourcebook</i> . Ed. Michael G. Moran and Debra Journet. Westport, CT: Greenwood, 1985. 117-62.
X		Miller, Carolyn R. "Rhetoric and Community: The Problem of the One and the Many." <i>Defining the New Rhetorics</i> . Ed. Theresa Enos and Stuart C. Brown. Newbury Park, CA: Sage, 1993. 79-94.
X	X	Miller, Carolyn R. "Technology as a Form of Consciousness: A Study of Contemporary Ethos." <i>Central States Speech J</i> 29 (1978): 228-36.
X		Miller, Carolyn R. "What's Practical about Technical Writing?" <i>Technical Writing: Theory and Practice</i> . Ed. Bertie E. Fearing and W. Keats Sparrow. New York: MLA, 1989. 14-24.
X		Miller, Carolyn R., and Jack Selzer. "Special Topics of Argument in Engineering Reports." <i>Writing in Nonacademic Settings</i> . Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 309-41.
X		Miller, Thomas P. "Treating Professional Writing as Social Praxis." <i>JAC</i> 11 (1991): 57-72.
X		Mills, Carol B., and Kenneth L. Dye. "Usability Testing: User Reviews." <i>TC</i> 32 (1985): 40-44.
X		Moran, Michael G. "The History of Technical and Scientific Writing." <i>Research in Technical Communication: A Bibliographic Sourcebook</i> . Ed. Michael G. Moran and Debra Journet. Westport, CT: Greenwood, 1985. 25-38.
X		Moran, Michael G., and Debra Journet, eds. <i>Research in Technical Communication: A Bibliographic Sourcebook</i> . Westport, CT: Greenwood, 1985.
X		Morgan, Meg, Nancy Allen, Teresa Moore, Dianne Atkinson, and Craig Snow. "Collaborative Writing in the Classroom." <i>Bulletin of Association for Business Communication</i> 50 (1987): 20-26.
X		Myers, Greg. "The Social Construction of Two Biologists' Proposals." <i>WC</i> 2 (1985): 219-45.

I	II	Text
X		Myers, Greg. <i>Writing Biology: Texts in the Social Construction of Scientific Knowledge</i> . Madison: U of Wisconsin P, 1990.
X		Neely, Kathryn A. "Woman as Mediatrix: Women as Writers on Science and Technology in the Eighteenth and Nineteenth Centuries." <i>IEEE</i> 35 (1992): 208-16.
X		Nelson, Theodor H. <i>Literary Machines</i> . Palo Alto, CA: Project Xanadu, 1987.
X		Nelson, Theodor H. <i>Literary Machines 90.1</i> . Sausalito, CA: Mindful P, 1990.
X	X	Odell, Lee. "Beyond the Text: Relations between Writing and Social Context." <i>Writing in Nonacademic Settings</i> . Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 249-80.
X		Odell, Lee, and Dixie Goswami. "Writing in a Nonacademic Setting." <i>Research in the Teaching of English</i> 16 (1982): 201-23.
X	X	Odell, Lee, and Dixie Goswami, eds. <i>Writing in Nonacademic Settings</i> . New York: Guilford, 1985.
X		Odell, Lee, Dixie Goswami, Anne Herrington, and Doris Quick. "Studying Writing in Nonacademic Settings." <i>New Essays in Technical and Scientific Communication: Research, Theory, Practice</i> . Ed. Paul V. Anderson, R. John Brockmann, and Carolyn R. Miller. Farmingdale, NY: Baywood, 1983. 17-40.
X		Ornatowski, Cezar. "Between Efficiency and Politics: Rhetoric and Ethics in Technical Writing." <i>TCQ</i> 1 (1992): 91-103.
X		Paradis, James. "Text and Action: The Operator's Manual in Context and in Court." <i>Textual Dynamics of the Professions: Historical and Contemporary Studies of Writing in Professional Communities</i> . Ed. Charles Bazerman and James Paradis. Madison: U of Wisconsin P, 1991. 256-78.
X	X	Paradis, James, David Dobrin, and Richard Miller. "Writing at Exxon ITD: Notes on the Writing Environment of an R&D Organization." <i>Writing in Nonacademic Settings</i> . Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 281-307.
X		Perelman, Chaim, and Lucie Olbrechts-Tyteca. <i>The New Rhetoric: A Treatise on Argumentation</i> . Trans. John Wilkinson and Purcell Weaver. Notre Dame: U of Notre Dame P, 1969.
X		Peters, Thomas J., and Robert H. Waterman, Jr. <i>In Search of Excellence: Lessons from America's Best-Run Companies</i> . New York: Harper & Row, 1982.
X		Porter, James E. "Intertextuality and the Discourse Community." <i>Rhetoric Review</i> 5 (1986): 34-47.
X		Prelli, Lawrence. <i>A Rhetoric of Science: Inventing Scientific Discourse</i> . Columbia: U of South Carolina P, 1989.
X		Price, Jonathan. <i>How to Write a Computer Manual: A Handbook of Software Documentation</i> . Menlo Park, CA: Benjamin Cummings, 1984.
X		Redish, Janice C., Robbin M. Battison, and Edward S. Gold. "Making Information Accessible to Readers." <i>Writing in Nonacademic Settings</i> . Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 129-54.
X		Russell, David R. "The Ethics of Teaching Ethics in Professional Communication: The Case of Engineering Publicity at MIT in the 1920s." <i>JBTC</i> 7 (1993): 84-111.
X		Rutter, Russell. "History, Rhetoric, and Humanism: Toward a More Comprehensive Definition of Technical Communication." <i>JTWC</i> 21 (1991): 133-53.
X		Sauer, Beverly A. "The Engineer as Rational Man: The Problem of Imminent Danger in a Non-Rational Environment." <i>IEEE</i> 35 (1992): 242-49.
X		Schell, David A. "Testing Online and Print User Documentation." <i>IEEE</i> 29 (1986): 87-92.
X		Schrivver, Karen A. "Document Design from 1980 to 1989: Challenges That Remain." <i>TC</i> 36 (1989): 316-31.
X		Schrivver, Karen A. "Evaluating Text Quality: The Continuum from Text-Focused to Reader-Focused Methods." <i>IEEE</i> 32 (1989): 238-55.

I	II	Text
X		Schriver, Karen A. "Quality in Document Design: Issues and Controversies." <i>TC</i> 40 (1993): 239-57.
X	X	Selzer, Jack. "The Composing Process of an Engineer." <i>CCC</i> 34 (1983): 178-87.
	X	Senge, Peter. <i>The Fifth Discipline: The Art and Practice of the Learning Organization</i> . New York: Doubleday, 1990.
X		Shneiderman, Ben. <i>Designing the User Interface: Strategies for Effective Human-Computer Interaction</i> . Reading, MA: Addison-Wesley, 1987.
X		Slack, Jennifer Daryl, David James Miller, and Jeffrey Doak. "The Technical Communicator as Author: Meaning, Power, Authority." <i>JBTC</i> 7 (1993): 12-36.
X		Soderston, Candace. "The Usability Edit: A New Level." <i>TC</i> 32 (1985): 16-18.
X		Souther, James W. "Teaching Technical Writing: A Retrospective Appraisal." <i>Technical Writing: Theory and Practice</i> . Ed. Bertie E. Fearing and W. Keats Sparrow. New York: MLA, 1989. 2-13.
X		Spilka, Rachel. "Influencing Workplace Practice: A Challenge for Professional Writing Specialists in Academia." <i>Writing in the Workplace: New Research Perspectives</i> . Ed. Rachel Spilka. Carbondale: Southern Illinois UP, 1993. 207-19.
X		Stine, Donna, and Donald Skarzenski. "Priorities for the Business Communication Classroom: A Survey of Business and Academe." <i>JBC</i> 3 (1989): 53-63.
X		Sullivan, Dale L. "Political-Ethical Implications of Defining Technical Communication as a Practice." <i>JAC</i> 10 (1990): 375-86.
X		Swales, John M. <i>Genre Analysis: English in Academic and Research Settings</i> . New York: Cambridge UP, 1990.
X		Swarts, Heidi, Linda A. Flower, and John R. Hayes. "How Headings in Documents Can Mislead Readers." <i>Document Design Project Technical Report No. 9</i> . Pittsburgh: Carnegie Mellon P, 1980.
X		Tebeaux, Elizabeth. "Redesigning Professional Writing Courses to Meet the Communication Needs of Writers in Business and Industry." <i>CCC</i> 36 (1985): 419-28.
X		Tebeaux, Elizabeth. "Toward an Understanding of Gender Differences in Written Business Communications: A Suggested Perspective for Future Research." <i>JBTC</i> 4 (1990): 25-43.
X		Tebeaux, Elizabeth, and M. Jimmie Killingsworth. "Expanding and Redirecting Historical Research in Technical Writing: In Search of Our Past." <i>TCQ</i> 1 (1992): 5-32.
X		Thrush, Emily A. "Bridging the Gaps: Technical Communication in an International and Multicultural Society." <i>TCQ</i> 2 (1993): 271-83.
X		Trimbur, John. "Consensus and Difference in Collaborative Learning." <i>CE</i> 51 (1989): 602-16.
X		Tufte, Edward R. <i>Envisioning Information</i> . Cheshire, CT: Graphics P, 1990.
X	X	Tufte, Edward R. <i>The Visual Display of Quantitative Information</i> . Cheshire, CT: Graphics P, 1983.
X		Van Dijk, Teun A., and Walter Kintsch. <i>Strategies of Discourse Comprehension</i> . New York: Academic P, 1983.
X		Van Pelt, William, and Alice Gillam. "Peer Collaboration and the Computer-Assisted Classroom: Bridging the Gap between Academia and the Workplace." <i>Collaborative Writing in Industry: Investigations in the Theory and Practice</i> . Ed. Mary M. Lay and William M. Karis. Amityville, NY: Baywood, 1991. 170-205.
X		Varner, Iris, and Linda Beamer. <i>Intercultural Communication in the Global Workplace</i> . Chicago: Irwin, 1995.
X		Weiss, E. H. <i>How to Write a Usable User Manual</i> . Philadelphia: ISI P, 1985.
X		Weiss, E. H. <i>How to Write Usable Documentation</i> . 2nd ed. Phoenix: Oryx, 1991.

I	II	Text
X		Weiss, Timothy. "The Gods Must Be Crazy': The Challenge of the Intercultural." <i>JBTC</i> 7 (1993): 196-217.
X		Weiss, Timothy. "Ourselves Among Others': A New Metaphor for Business and Technical Writing." <i>TCQ</i> 1 (1992): 23-36.
X		Winkler, Victoria M. "The Role of Models in Technical and Scientific Writing." <i>New Essays in Technical and Scientific Communication: Research, Theory, Practice</i> . Ed. Paul V. Anderson, R. John Brockmann, and Carolyn R. Miller. Farmingdale, NY: Baywood, 1983. 156-84.
X		Winsor, Dorothy A. "Communication Failures Contributing to the Challenger Accident: An Example for Technical Communicators." <i>IEEE</i> 31 (1988): 101-07.
X		Winsor, Dorothy A. "The Construction of Knowledge in Organizations: Asking the Right Questions about the <i>Challenger</i> ." <i>JBTC</i> 4 (1990): 7-21.
X		Winsor, Dorothy A. "An Engineer's Writing and the Corporate Construction of Knowledge." <i>WC</i> 6 (1989): 270-85.

Journal Abbreviations:

<i>CCC</i>	<i>College Composition and Communication</i>	<i>JBTC</i>	<i>J of Business and Technical Communication</i>
<i>CE</i>	<i>College English</i>	<i>JTWC</i>	<i>J of Technical Writing and Communication</i>
<i>IEEE</i>	<i>IEEE Transactions on Professional Communication</i>	<i>TC</i>	<i>Technical Communication</i>
<i>JAC</i>	<i>J of Advanced Composition</i>	<i>TCQ</i>	<i>Technical Communication Quarterly</i>
<i>JBC</i>	<i>J of Business Communication</i>	<i>WC</i>	<i>Written Communication</i>

Results: The Points of Reference

The points of reference have been referred to in presentations at the Conference on College Composition and Communication and examples from the list are used to support claims in another article ("Strength"); however, the complete list has not been published previously. The two sets of texts provide points of comparison for describing trends in technical communication's conversations and activities, and two sets avoid the appearance of a canon. A single set of texts appears fixed; two sets show changes across time. The following discussion describes some of these changes. Most certainly other observations and more in-depth study of these observations can and should be made.

Topics

The topics of the points of reference may be broadly identified as discussions of professional issues (defining technical communication, pedagogy, and research methods), rhetoric and the rhetorics of communities, document design and technology issues, and workplace communication. The discussions overlap.

Texts from Set I define technical communication, outline research methods, and address pedagogical issues. Carolyn Miller ("Humanistic Rationale" and "What's Practical") and David Dobrin ("What's Technical") provide some of the groundwork for these discussions. The anthologies *New Essays in Technical and Scientific Communication* (Anderson, Brockmann, and C. Miller) and *Writing in Nonacademic Settings* (Odell and Goswami) serve as forums for the discussions. The essays by Paul Anderson ("What Survey Research Tells Us about Writing at Work") and Lester Faigley ("Nonacademic Writing: The Social Perspective") describe research problems. These texts from the late 1970s and early 1980s have had significant influence on technical communication scholarship as evidenced by the significant number of citations for each.

The points of reference from Set II also define technical communication and pedagogy but in more depth and with a seemingly greater emphasis on "Political-Ethical Implications of Defining Technical Communication as a Practice"—to use Sullivan's title. Similar titles and discussions of the ethical responsibilities of technical communicators are found in the articles "Between Efficiency and Politics" (Ornatowski), "Ourselves among Others" (Weiss), and "The Ethics of Teaching Ethics in Professional Communication" (Russell). Dorothy Winsor ("Communication" and "Construction") and Paul Dombrowski use the communication problems of the *Challenger* accident to illustrate the ethical responsibilities of technical communicators.

Discussions of research methods appear to fall out of the discussions although Janice Lauer and William Asher's *Composition Research* is frequently cited over the ten-year period. The discussions of research methods have moved into the reports of research projects. However, as graduate programs strengthen, discussions focused only on methods of research are being published, for example, the September 1997 special issue of *IEEE* and the November 1999 issue of *TC*. Queries about research methods courses and resource material periodically appear on the ATTW listserv (most recently in February 2000). The next set of citations more than likely will capture some of these texts.

An increased interest in the history of technical communication appears with the texts in Set II. Robert Connors' 1982 article "Technical Writing Instruction in America," published early enough to be among the frequently cited texts in Set I, appears only on the list of frequently cited texts in Set II. By 1997, technical communication was established and researchers had both a recent history to work with (see for example Russell Rutter and George Hayhoe, Freda Stohrer, Lawrence Kunz, and Sherry Southard) and an interest in exploring early historical documents (Killingsworth, Kathryn Neely, and Tebeaux, for example). The texts from Set II have the earlier texts to build upon, refining the definitions and developing research methods and teaching activities to conform to the current context.

Discussions of rhetoric and rhetorics of specific communities have increased and incorporate a range of workplace examples. The anthology *Textual Dynamics of the Professions* edited by Charles Bazerman and James Paradis contains several examples. Early discussions of rhetoric capture the texts about the canons of rhetoric, the reader and audience, and the composing process (for example, Thomas Huckin; Teun van Dijk and Walter Kintsch; Lisa Ede and Andrea Lunsford, "Audience Addressed"; the work of Linda Flower and John Hayes and their co-authors). These references are common to both technical communication and composition studies. The influence of cognitive psychology and reading theory is obvious. In Set II, however, there is a shift away from composition theory. James Kinneavy drops off the list and Ede and Lunsford publish a workplace study in *Singular Texts/Plural Authors*, but Mikhail Bakhtin and Lyotard appear.

Discussions of the rhetoric of visuals build on texts found in Set I (Ben Barton and Marthalee Barton; Stephen Bernhardt; Edward Tufte, for example) and provide a link with discussions of document design. Discussions of document design appear to be expanding the theoretical base and evaluating the influence of technology. Pragmatic-oriented discussions make up document design in Set I (for example, Philippa Benson; Daniel Felker's work with colleagues; James Hartley; Janice Redish, Robbin Battison, and Edward Gold). Document design discussions represented in Set II include the how-to books by Brockmann, Horton, and Weiss, but the discussions also provide theoretical support for coordinating the verbal and visual aspects of a document and the role and influence of technology on document development (see Jay Bolter; John Carroll; Nelson, for example).

Rhetoric of science discussions have increased. In Set I, Bazerman ("Scientific") and Greg Myers ("Social") are cited. In Set II, Bazerman (*Shaping Written Language*) and Myers (*Writing Biology*) are joined by Alan Gross, Michael Halloran, Nigel Gilbert and Michael Mulkay, Bruno Latour, Latour and Steve Woolgar, and Lawrence Prelli. Killingsworth and Jacqueline Palmer's *Ecospeak* studies environmental rhetoric. The gender studies (Jo Allen; Lay "Androgynous," "Feminist," and "Interpersonal"; Neely; Tebeaux "Toward") do not fall neatly into any of the topics; they overlap discussions of rhetoric and workplace communication. *Women's Ways of Knowing* (Belenky, Clinchy, Goldberger, and Tarule) and *In a Different Voice* (Gilligan) are two points of reference from outside of technical communication that have included discussions of collaboration and gender.

In Set I, discussions of workplace communication incorporate the theory and practice of social construction and collaboration: for example, Kenneth Bruffee; Mary Belenky, Blythe Clinchy, Nancy Goldberger, and Jill Tarule; Marilyn Cooper; Barbara Couture and Jone Rymer; Teresa Harrison. The research is reported in the workplace studies by Lee Odell and Dixie Goswami and Paradis, Dobrin, and Richard Miller—benchmark studies in technical communication

for research, if frequency of cites is the criterion. Workplace studies continue in Set II with theoretical support found in the work of Hall and Clifford Geertz, among others. Technical communication researchers cross disciplines to find theoretical support and research methods in linguistics, anthropology, and sociology. Studies by Robert Brown and Carl Herndl; Stephen Doheny-Farina and Odell; and Killingsworth and Betsy Jones appear in Set I and Set II. The workplace studies have expanded beyond local sites to national and international events, most notably the *Challenger* accident but also events such as the computation problem with Intel's Pentium chip that move beyond one office and a small set of documents.

The topics cover a wide range of communication activities. Closer analysis of the many research paths technical communication scholars take will provide support and starting points for future research projects.

Authors

Observations about the authors' genders, the number of single-authored and team-authored texts, and the most frequently cited authors provide insight into who is moving technical communication scholarship forward. In the ten-year span of the citations, several authors appear in Sets I and II, but there are authors who appear in Set I who do not appear in Set II and vice versa. For the 163 texts, there are 252 authors. (The data for the 31 texts common to both sets are displayed as part of each set in Figures 1 through 6.) The author(s) for each text was counted, and authors appearing more than once as a point of reference were counted for each of their publications. Each team member was counted and the gender of each member was determined. There are 60 teams (texts with more than one author) represented in the 163 texts. The editors of anthologies were counted but not the authors with essays in the anthology unless the essay also was cited frequently.

Two figures graphically illustrate differences in the gender representation of the authors. Figure 1 shows the distribution of gender between Set I and Set II. The gender representation increased for both females and males between Set I and Set II; however, male representation increased by 35.6%, female 16.1%. The gender distribution for the 60 teams is shown in Figure 2. Male-only teams and teams with a male as first author increased between Set I and Set II. Female-only teams and teams with a female as first author decreased between Set I and Set II. (No effort was made to determine the significance of the order of names in the list of authors in a team. In fact, the lists of team authors are almost equally listed in alphabetical order and non-alphabetical order.) Again, for each gender the change is not statistically significant between the sets; however, taken together, the trend toward more male-authored texts and fewer female-only teams is worth noting.

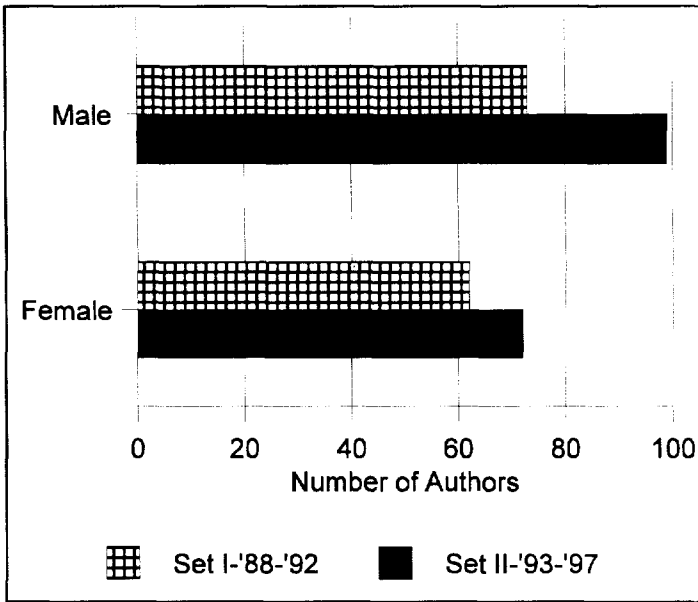


Figure 1. Gender distribution for the authors of the points of reference. Male authors outnumber female authors in each set of citations.

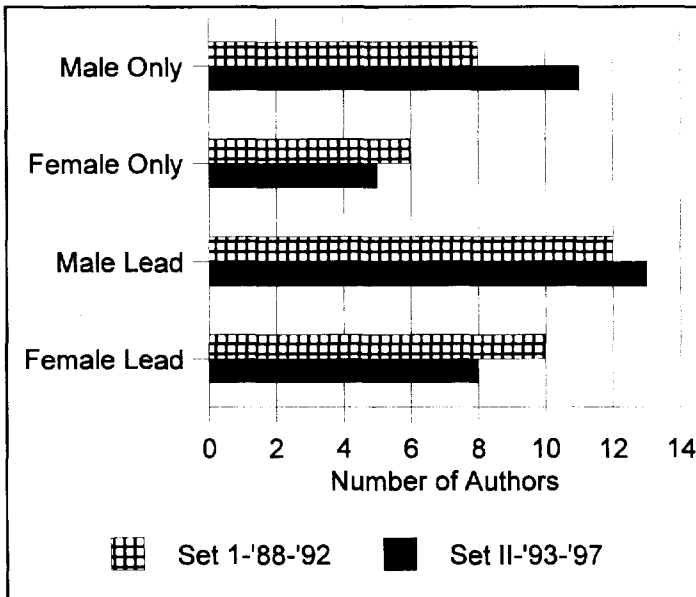


Figure 2. Gender distribution by teams for authors of the points of reference. The number of teams with a female first author and female-only teams decreased between 1988-92 and 1993-97.

Women outnumber men in both the workplace and academic arenas (Dragga). From the annual Society for Technical Communication (STC) *Salary Survey* and from the membership directory of the Association of Teachers of Technical Writing (ATTW), we can get an idea of the gender representation. Over half of the respondents to the STC survey were female. A quick, informal count of the ATTW membership yields roughly a 55% female to 45% male representation. The STC information has less relevance here because this study focuses on the academic forums, but many of the team projects involve a study of a workplace site. The ATTW membership is only partially representative of the academic community—and, perhaps, skewed more toward female representation because of its close affiliation with the humanities rather than engineering or computer science. Regardless of where the support is pulled from, the trend remains: the number of male-authored texts are increasing and female-only teams are decreasing.

Nevertheless, women have made and continue to make significant contributions to technical communication. Carolyn Miller is the second most frequently cited author across the sets of citations (see Set A, Table 2 discussed later). In addition to her single-authored articles, Miller has teamed with Jack Selzer, Herndl and Barbara Fennell, and co-edited *New Essays in Technical and Scientific Communication* with Anderson and Brockmann (Table 1). Other women have more than one frequently cited text either as sole author or as part of a team: Nancy Allen, Rebecca Burnett, Linda Carey, Barbara Couture, Lisa Ede, Linda Flower, Dixie Goswami, Mary Lay, Andrea Lunsford, Teresa Moore, Meg Morgan, Janice Redish, Jone Rymer, Karen Schriver, Heidi Swarts, Elizabeth Tebeaux, and Dorothy Winsor. Ede and Lunsford are the only authors to appear on the list from Reinsch and Lewis and from the Research Think Tank (Rogers).

Comparing the single-authored texts and team-developed texts between Set I and Set II shows one trend that is significant—but not surprising (see Figure 3): The number of texts published by an individual author in Set II is almost two times the number published in Set I. The number of single-authored texts and the number of team-authored texts is almost identical for Set I; however, there is a significant increase in single-authored texts in Set II. One explanation is that tenure and promotion boards (particularly those associated with the humanities) place more value on single-authored works than on collaboratively written texts. The increased recognition of technical communication as a field of study with undergraduate and graduate programs has increased the status of technical communication faculty members in departments and at the same time increased research and publishing demands on the faculty.

The implication of this emphasis on single-authored texts goes beyond tenure and promotion issues. Studies of the workplace are essential for a healthy balance of scholarly activity between research, theory, and practice. However, workplace studies often require teams

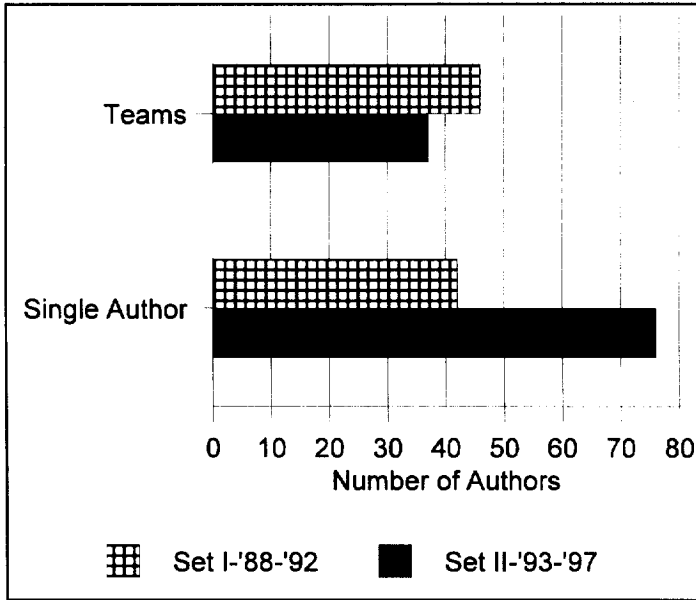


Figure 3. Distribution of single-authored and team-authored points of reference. The number of single-authored texts increased significantly between 1993 and 1997.

of researchers to handle the multiple variables and triangulation procedures. Certainly studies of the workplace are conducted by one person, but the limits of one researcher's time and expertise restrict the scope of such workplace studies (see for example the studies by Doheny-Farina, Beverly Sauer, and Selzer). Perhaps another way to look at the imbalance between single-authored texts and team-authored texts is to note that the majority of single-authored texts are discussions focused on developing a sounder theoretical base for technical communication. Such discussions are appropriate at this time in the history of technical communication for strengthening its knowledge base as graduate programs develop. When the next five years of citations (1998-2002) are collected, it will be interesting to see if the authors who have published single-authored texts conduct workplace research and publish team projects. Other factors such as the impact of the STC's research grants will have had time to develop. Regardless, a better balance is needed between single-authored and team-authored texts to better complement the close ties between workplace practice and theory in technical communication.

Future studies of authors can describe the discipline and workplace experience the authors bring to technical communication. Their affiliations with organizations such as STC, IEEE Professional Communication Society (IEEE-PCS), ATTW, Association for Business Communication, Association for Computing Machinery, and Ameri-

can Society for Training and Development can identify forums with publications and international conferences that offer opportunities to expand conversations.

Forums

Describing the forums for the points of reference may best illustrate the evolution and emergence of technical communication as a discipline. The forums are identified as professional journals, anthologies, and books. (Textbooks, conference proceedings, and references to Web sites and listservs, which began appearing in Set II, are not included in this study.)

Figure 4 illustrates the distribution of the forums between Set I and Set II. The number of anthologies and essays in anthologies remained about the same, but points of reference found in journal articles and books increased significantly across the ten years. There is a 57% increase in journal articles and a 90% increase in the books frequently cited.

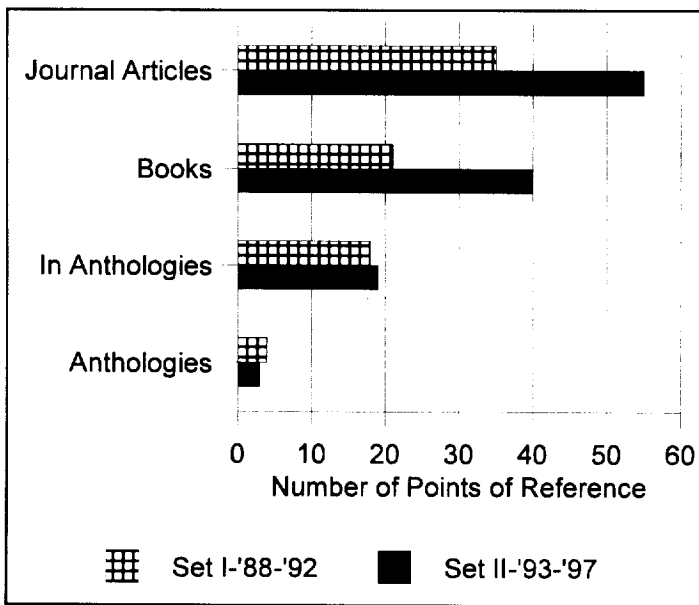


Figure 4. Distribution of the points of reference in the forums. The number of books has almost doubled indicating an increase in scholarship requiring a book-length forum.

Two observations about the change between the points of reference in Set I and Set II illustrate the disciplinary activities of technical communication. There has been:

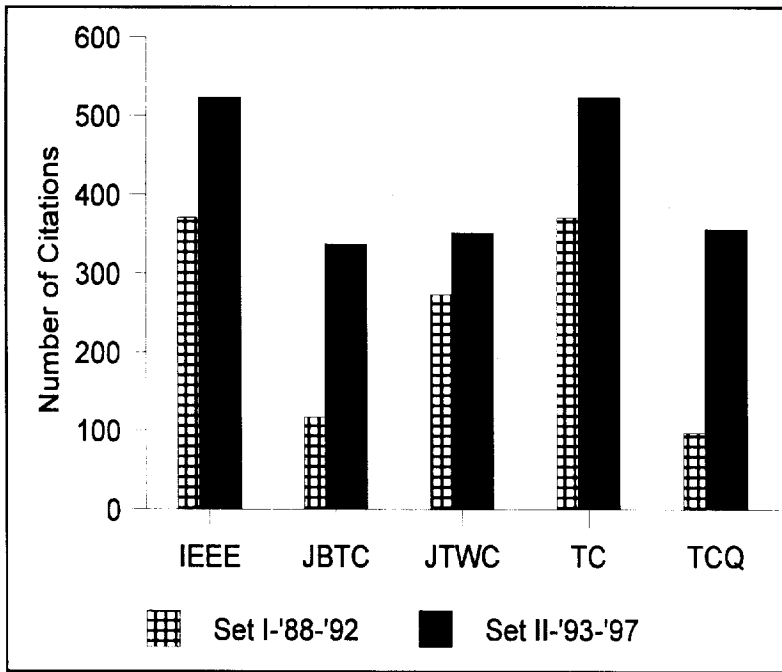


Figure 5. Citations collected from the technical communication journals have increased, particularly for *JBTC* and *TCQ*.

- a significant increase in the number of references to the technical communication journals (Figure 5), and
- an increase in the number of points of reference found in the five technical communication journals (Figure 6).

The 57% increase in the points of reference found in journals links directly to the significant increase in single-authored texts but more importantly to the growth of technical communication as a field to study and report on. Professional journals provide the most common forum for publishing because of the relatively quick publication process. The peer review process and for some journals the affiliation with a professional organization affirms the value of the content. Collecting citations only from five technical communication journals biases this study to some extent, but it also targets the key forums in technical communication for their support of the discipline's activities (Goggin; Sullivan).

Both increases, the increase in total references and the increase in points of references to the technical communication journals, affirm the emergence of technical communication as a recognizable field of study. The increase may be attributed in part to the overall increase in citations collected from each journal, which in turn may be directly

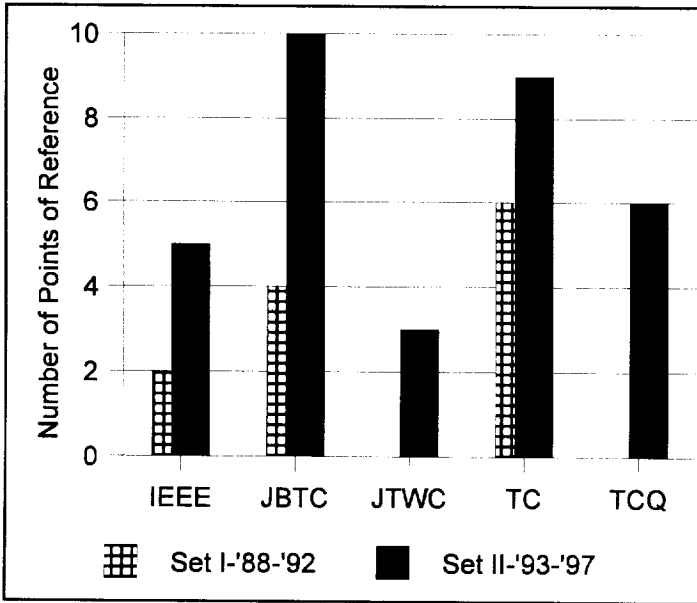


Figure 6. Distribution of the points of reference in the technical communication journals. All of the journals have at least three articles cited frequently.

linked to the increase in scholarly activities and discussions of practice occurring since the mid-1980s. Technical communication authors from the humanities and engineering schools publish in the journals.

The number of citations increased for each of the five journals but most notably for *JBTC* and *TCQ*. *JBTC* and *TCQ* have become the leading publication outlets for authors with an academic affiliation. *JBTC* and *TCQ* serve as the forums for the more theoretical discussions that connect to pedagogical and workplace issues. *IEEE* and *TC*, publications of the professional organizations *IEEE-PCS* and *STC*, respectively, publish research and theoretical discussions from the point of view of the practitioner. *JTWC* publishes teaching and practice-based articles “of most functional forums of communication” (masthead 1999). The technical communication journals are active forums for scholarly conversations.

The 90% increase in books cited as influential is one indication that the knowledge base of technical communication is growing. The research and theoretical base in conjunction with issues from practice provide enough material to support book-length development. Three observations may be made about books as an important forum. First, not all of the frequently cited books are published by authors associated with technical communication. In fact, the influence of other disciplines becomes apparent in the books frequently cited. For example, the disciplines of linguistics (John Swales), anthropology

(Geertz), and philosophy of science (Kuhn) are among those represented. Second, several of the books are actually collections of works (often previously published) by one author: for example, *The Dialogic Imagination* (Bakhtin), *Shaping Written Knowledge* (Bazerman), and *Signs, Genres, and Communities in Technical Communication* (Killingsworth and Michael Gilbertson). Third, a number of the books cover issues from the workplace: current business culture (for example, Terrence Deal and Allan Kennedy's *The Corporate Culture*; Thomas Peters and Robert Waterman's *In Search of Excellence*; Senge's *The Fifth Discipline*) and software documentation (for example, the books by Brockmann; Joseph Dumas and Redish; Horton; Weiss).

While anthologies do not have a prominent position in the points of reference identified from Set I and Set II, they are important forums for technical communication discussions. They bring together authors to discuss a topic or common theme. However, the influence of two anthologies must be acknowledged: *New Essays in Technical and Scientific Communication* (Anderson, Brockmann, and C. Miller) and *Writing in Nonacademic Settings* (Odell and Goswami). Not only do these anthologies appear in Set I and Set II, but several essays from each also appear in Set I and Set II (in *New Essays* see Bazerman; Dobrin; Flower, Hayes, and Swarts; Huckin; Odell, Goswami, Anne Herrington, and Doris Quick; Victoria Winkler; and in *Writing in Nonacademic Settings* see Anderson; Doheny-Farina; Faigley; C. Miller and Selzer; Odell; Paradis, Dobrin, and R. Miller; Redish, Battison, and Gold). These anthologies brought together authors writing specifically about technical communication in the early 1980s. The authors established important themes and research agendas in the 1980s that have carried into the 1990s. However, the anthologies appearing in Set II should not be overlooked: for example, *Textual Dynamics of the Profession* (Bazerman and Paradis), *Collaborative Writing in Industry* (Lay and William Karis), or *Writing in the Workplace* (Rachel Spilka). They continue the tradition of anthologies as important forums for technical communication discussions.

Anthologies and books will continue to provide forums for authors, particularly with the increased professionalization of the technical communication field and the increased number of graduate programs with faculty and students developing research and theory. Most importantly, publishers have recognized the increased interest in technical communication: for example, The ATTW Contemporary Series in Technical Communication published by Ablex; the SUNY Press series Studies in Scientific and Technical Communication; the Rhetoric, Knowledge, and Society series from Erlbaum; and The Allyn and Bacon Series in Technical Communication.

Future studies should look at the impact of the anthology as a forum and the evolution from essays in anthologies to anthologies that are collections of one author's work to the book by an author(s) developed around a single topic.

An Example of the Evolution and Knowledge Building of Technical Communication

One example illustrates the changes, the malleable nature of discipline building, and the development of technical communication's knowledge base. The selected points of reference, shown in Table 2, offer a magnified view of the texts identified in Set I and Set II and, I suggest, in turn a representative view of technical communication scholarship. The points of reference listed in each column are the texts most frequently cited from Set I (the left column), Set II (the middle column), and Set A, comprised of Set I and Set II combined (the right column). That is, C. Miller's "Humanistic Rationale" is the most frequently cited text from Set I while Bazerman's *Shaping Written Knowledge* is the most frequently cited from Set II. When Set I and Set II are combined to form Set A, "Writing at Exxon ITD" (Paradis, Dobrin, and R. Miller) is the most frequently cited. The shaded texts are common to Set I and Set II and appear in Set A. The boxed texts do not appear on the Set A list although in most cases they just missed the cutoff criteria. The different texts in Set I and Set II confirms that looking at just the sets of citations combined (Set A) or just one set (Set I or Set II) captures only one picture of the scholarly conversations and does not show the evolution of technical communication.

The topics that define the activities of technical communication are represented by the points of reference identified in Set A. They include discussions of the profession (Anderson; Anderson, Brockmann, C. Miller; Faigley; Stephen Katz; Sullivan; C. Miller, "Humanistic" and "What's Practical"; Dobrin, "What's Technical" and *Writing and Technique*); workplace communication (Doheny-Farina; Ede and Lunsford; Faigley, Thomas Miller; Odell; Paradis, Dobrin, R. Miller; Selzer; Winsor); rhetoric of science (Bazerman; Kuhn) and rhetoric of visuals (Tufte); collaboration (N. Allen, Dianne Atkinson, Morgan, Moore, and Craig Snow; Bruffee); and issues of document development and design (Brockmann; Carroll; Flower, Hayes, Swarts; Horton; Huckin). While the authors cited for these points of reference may be significant voices between 1988 and 1997, the discussions evolve from a number of authors exploring the issues.

Evolution is seen immediately with the change in texts between Set I and Set II. Ten points of reference changed between the 1988-92 collection and the 1993-97 collection. Among the ten texts from Set I that drop off Set II are the early discussions of collaboration as well as the two cognitive psychology-based discussions (Flower, Hayes, Swarts; Huckin). The only workplace study to join the points of reference in Set II is Ede and Lunsford's study of collaboration. Winsor's study of the texts surrounding the *Challenger* accident is a study of the rhetoric of a particular community. The rhetoric of science and the rhetoric of visuals move to a more prominent position in the conversations in Set II as authors further define technical communication.

Table 2

A Comparison of the Top 16 (17) Frequently-Cited Texts. The table illustrates evolution (comparing Set I and Set II) and knowledge building (combining Set I and Set II to form Set A) for scholarship in technical communication.

Set I – 1988-1992	Set II – 1993-1997	Set A – 1988-1997
Humanistic Rationale C. Miller	<i>Shaping Written Knowledge</i> Bazerman	Writing at Exxon Paradis, Dobrin, R. Miller
Writing at Exxon Paradis, Dobrin, R. Miller	Writing at Exxon Paradis, Dobrin, R. Miller	Humanistic Rationale C. Miller
<i>Structure of Scientific Revolutions</i> Kuhn	<i>Singular Texts/Plural Authors</i> Ede, Lunsford	<i>Structure of Scientific Revolutions</i> Kuhn
What We Learn from Writing Faigley, T. Miller	Humanistic Rationale C. Miller	<i>Shaping Written Knowledge</i> Bazerman
Writing . . . Emerging Organization Doheny-Farina	What Survey Research Tells Us Anderson	What Survey Research Tells Us Anderson
What Survey Research Tells Us Anderson	<i>Designing/Writing Online</i> Horton	Writing . . . Emerging Organization Doheny-Farina
What's Technical About Dobrin	Ethic of Expediency Katz	<i>Singular Texts/Plural Authors</i> Ede, Lunsford
<i>New Essays</i> Anderson, Brockmann, C. Miller	<i>Structure of Scientific Revolutions</i> Kuhn	What We Learn from Writing Faigley, T. Miller
Beyond the Text Odell	<i>Writing Better Computer</i> Brockmann	What's Technical About Dobrin
Cognitive Approach to Readability Huckin	Writing . . . Emerging Organization Doheny-Farina	<i>Writing Better Computer</i> Brockmann
Revising Functional Documents Flower, Hayes, Swarts	<i>Writing and Technique</i> Dobrin	Composing Process of Engineer Selzer
Nonacademic Writing Faigley	What's Practical About C. Miller	<i>Visual Display</i> Tufts
What Experienced Collaborators Allen, Atkinson, Morgan, Moore, Snow	Construction of Knowledge Winsor	Nonacademic Writing Faigley
Composing Process of Engineer Selzer	Political-Ethical Implications Sullivan	What Experienced Collaborators Allen, Atkinson, Morgan, Moore, Snow
Collaborative Learning Bruffee	<i>Nurnberg Funnel</i> Carroll	<i>Writing and Technique</i> Dobrin
<i>Shaping Written Knowledge</i> Bazerman	<i>Visual Display</i> Tufts	Beyond the Text Odell
		Collaborative Learning Bruffee

The texts are listed in order of frequency of citations with the most frequently cited at the top of each column. The total for the sets varies because more than one text may be cited the same number of times (the last column). The shading indicates texts common to Set I and Set II. The boxed texts do not appear on the combined list Set A.

Computer documentation has a prominent place in the discussions in Set II. Technical communication practitioners no doubt have influenced this discussion as they have accepted the responsibility for

providing many of the documents and much of the training during the rapid increase of computers in the workplace. It will be interesting to see if this discussion persists when Set III (1998-2002) is collected, or if the discussion moves to forums such as *Human Factors*, *Information Design Journal*, or *Journal of Computer Documentation*, for example, or if the discussions shift from how-to texts to more theoretical discussions about technology or more research studies on usability.

Discussion of the ethical responsibilities of technical communication professionals continues with academic-affiliated authors debating the implications of decisions made by technical communicators and calling for a pedagogy that develops awareness in the student writer. This topic is an appropriate one for the readers of the journals selected for this study, in particular the readers of *JBTC* and *TCQ*. Many of these readers are the teachers of technical communicators; the authors articulate the questions of teachers.

A knowledge base develops from points of references (Set A) listed in the third column of Table 2, but even this list will change with the additional citations collected every five years. Thus the knowledge base for technical communication develops but is malleable, shifting its shape but not so fluid that it loses its identity.

The authors represent practitioners, teachers, researchers, and theorists (most performing more than one of these roles) from across the disciplines (composition, rhetoric, science, psychology, computer science, graphic arts). While male authors outnumber female authors more than 2 to 1 in each set, female authors, particularly Carolyn Miller, have made significant contributions. Collaboratively written texts declined between Set I (31%) and Set II (12.5%), shown in Table 2 (and overall from 50.6% in Set I to 32.5% in Set II, Table 1). As noted earlier, this may be a direct result of the professionalization of technical communication in the academy, and partly the result of the favoring of single-authored texts by tenure and promotion boards in the humanities.

All of the forums are represented in the points of reference in Table 2: journal articles, essays in anthologies, anthologies, and books. The number of journal articles among the three sets is almost equal (6-5-6) with only *JBTC* (Allen, Atkinson, Morgan, Moore, and Snow; Winsor) representing a journal forum specific to technical communication. The other journals represented are *College English* (Bruffee; Faigley, T. Miller; Katz; C. Miller), *College Composition and Communication* (Selzer), *Journal of Advanced Composition* (Sullivan), and *Written Communication* (Doheny-Farina). Books are the forum for half of the points of reference in Set II. It is the essays in anthologies that drop off Set II although the essays from Odell and Goswami's *Writing in Nonacademic Settings* reappear when Set I and Set II are combined to form Set A. The authors of most of the books (Brockmann, Carroll, Dobrin, and Ede and Lunsford) have direct ties to technical communication and the topics are specific to technical communication. Kuhn and Tufte established much of the groundwork upon which these and other authors have built.

Comparing the points of reference among the top most frequently cited texts provides a glimpse of the body of knowledge that comprises technical communication. Further study of sets of texts from Set I and Set II will contribute to understanding the activities and research agendas of practitioners and scholars.

Conclusion

The points of reference demonstrate that technical communication has an identity that emerged in the 1980s as practice, teaching, and research converged and undergraduate and graduate programs developed. They are representative of the knowledge base for technical communication, but they also represent a knowledge base that adjusts to the professional activities of the communication environment. The malleable nature of the discipline allows it to draw from across the disciplines for research and theoretical support and to incorporate changes in practice.

Many readers will skim the points of reference identified in Table 1 to see which texts are on the list or to see if one of their publications is on the list. Like any list, we tend to check off what we have read or written, and then we note what we should consider reading or researching. The reader should keep in mind the time frame for this study: 1988-1997. The list does not show the early—and very significant—contributors to the building of technical communication in the academy and the direct links with workplace events. Not captured in the points of reference are, for example, the early contributions from textbook writers such as Sada Harbarger in the 1920s, J. W. Souther in the 1950s, or Kenneth W. Houp and Thomas E. Pearsall in the 1960s, among many others; the builders of organizations such as the Association of Teachers of Technical Writing or the Council for Programs in Technical and Scientific Communication; or the first journal editors (for example, Jay Gould, *JTWC*, and Don Cunningham, *TWT*). Nor does the list capture the most current activities of technical communication professionals—the daily activities that move the profession forward, for example, distance education and Web-based documents. The points of reference provide connections between past and present activities.

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