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UNDERGRADUATE AND GRADUATE PROGRAMS IN TECHNICAL COMMUNICATION

A Thesis

Presented for the

Master of Arts

Degree

The University of Tennessee, Knoxville

Margaret Ortigara

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ABSTRACT

Since the middle of this century, when the first academic programs in technical communication emerged, the field of has grown rapidly. Many programs have been established to fill the need for technical communicators, but the field has not yet been clearly defined. Therefore, the philosophies and the curricula at many institutions vary greatly.

This study looks at a range of undergraduate and graduate programs in technical communication, closely examing and comparing the curricula at some of the older programs in this country. The curricula included in this study have been gathered from the directors of the programs as part of an effort to update the directory of the Society for Technical Communication, Academic Programs in Technical Communication. The programs are divided into categories according to the type of degree granted; for example, one category is Bachelor of Science in Technical Communication, and another is Master of Arts in English with an Emphasis in Technical Communication.

Past and current issues regarding these academic programs are explained to provide a clear understanding of the development of the field and to reveal the directions in which it is heading. The final chapter looks at three important issues facing educators in the field of technical

communication today: (1) how to balance the theoretical and the practical aspects in these programs; (2) how to define the differences between undergraduate and graduate programs; and (3) how to establish consistency among programs at different schools.

For the maturation process of this academic field to continue, these issues need to be resolved. By the categorization of programs according to the degree granted, this study suggests one method of establishing consistency among programs while still allowing for some flexibility in the field.

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CHAPTER I

THE HISTORICAL PERSPECTIVE

1.1 Introduction

In 1955, a one-page article in the Technical Writing Review began with this futuristic proclamation: "Members of the Society of Technical Writers may look forward to a day when a curriculum and a degree will be offered them by institutions of higher learning" (Hickok 7). This pronouncement has certainly been fulfilled in the three decades since the publication of this article. In fact, the very year that the Review (later to become Technical Communication) carried it, the first student was graduated from Rensselaer Polytechnic Institute's master's degree program in technical communication (Anderson 1984, 5).

Following Rensselaer's lead, many schools developed an array of programs to prepare students for the field of technical communication. In 1976, the Society for Technical Communication (STC), a professional society whose members include both practicing technical communicators and academicians, produced the first edition of Academic Programs in Technical Communication. That volume included listings from a number of programs: four leading to an associate's degree, ten offering a baccalaureate degree, and

six leading to a master's degree. In 1981, STC published the second edition of the listing. This edition also discussed four programs leading to an associate's degree. However, dramatic differences occurred in the more advanced degrees: 21 bachelor's, 8 master's, and 1 doctorate. This doctoral program, at Rensselaer Polytechnic Institute, culminated in a degree in communication and rhetoric; the program was founded earlier, in 1952. The existing program had gained a new focus towards technical communication.

The third edition of Academic Programs in Technical Communication appeared in 1985. This volume contained descriptions of 6 two-year institutions offering associate's degrees, 37 four-year institutions with bachelor's degrees, 18 institutions with master's degrees, and 16 certificate programs, which included some two-year programs, some minor programs, and some limited graduate programs. Currently, an STC committee is gathering information for a new edition of the volume. Already, a significant number of new programs have been brought to the attention of the committee; the upcoming edition will certainly be larger than the last.

The present study is an outgrowth of the information-gathering activities underway for that upcoming edition. All the curriculum descriptions in the next two chapters come from the information gathered from the program directors for the new directory. The schools included here are those that the committee contacted first: those schools

that had programs listed in the previous directory. Therefore, all these schools have had technical communication programs for at least five years; the programs discussed herein are well established and have been successful for a number of years.

While the information presented here is the result of the preliminary preparation for the upcoming STC directory, this study is not merely a preliminary version of that document. Academic Programs in Technical Communication serves as a listing of programs; its organization is alphabetical by institution. The compilers of the document make no attempt to organize the programs or to compare the curricula, except in some general tables and comments. In this study, programs are grouped according to the type of degree granted; within these categories, curricula are closely examined and compared. No listing to date has used this type of organization to analyze programs.

The purpose of this study is to provide a clear and specific overview of the range of programs currently in existence and to examine the issues surrounding them. More comprehensive listings of programs can be found elsewhere; however, more analytic comparisons among programs have yet to be produced. The organization and the results of this study should prove useful to students, in understanding the available choices in education; to educators, in relating their programs to others; and to employers, in realizing the

variety of backgrounds that their employees emerge from. Additionally, this work can serve as a baseline for subsequent studies. From this framework that organizes and compares programs, future studies can analyze and evaluate these established programs and the newer programs that have emerged.

1.2 Tracing the Roots of Academic Programs

While the first degree programs emerged in the 1950s, technical writing courses were being taught long before that. Robert J. Connors presented a comprehensive history in "The Rise of Technical Writing Instruction in America" (Connors 1982). A summary of Connors' article is valuable in understanding the origins and development of academic programs in technical communication.

Many people point to World War II as having created the demand for technical writers; Connors began his study with the Civil War. The first technical writing courses began in the schools of engineering that grew to fill the "technical needs of postwar America" (230). At first these schools were graduating students who had less than rudimentary skills in English, so the beginning of the twentieth century saw the beginning of specialized writing classes devoted to the needs of engineering students. Connors considered the first genuine technical writing textbook for use in college

courses to be The Theory and Practice of Technical Writing, published in 1911 by Samuel Chandler Earle of Tufts College (332).

With the demand for a more humanistic education for engineers increasing, more technical schools added English faculty and offered additional courses in writing. By 1920, 64 percent of all engineering schools required some sort of technical writing course for their students (335). The subject of writing courses for technical students remained controversial, and the difficulty of finding appropriate teachers was (and still is) a problem. The Depression forced many schools to limit the number of "nonessential" courses taught.

World War II acted as a catalyst for the profession of technical communication. During the war, technical writers were in great demand to write manuals for new military technology. This increased need helped make technical writing a job in itself rather than just "an adjunct function of some other activity." After the war ended, technical writing became an accepted profession "as wartime technologies were translated into peacetime uses" (341). Large corporations developed separate technical writing departments, finding this more economical than paying engineers both to design and to write.

The 1950s brought maturation to the profession of technical writing. Within the university, writing courses

for engineers became more refined and sophisticated, addressing more directly the actual needs and weaknesses of the engineering student. Moreover, as noted earlier, the 1950s saw the beginning of specialized curricula to prepare technical communicators. Through the 1960s, much effort was put into defining the field of technical writing; this added to the interest in the process of technical writing and the best methods for teaching it (345). Connors asserted that the 1970s gave technical writing teachers increased acceptance within their English departments and among the various departments that they served; in many schools, teachers were promoted and given tenure on the basis of their research and publications in technical writing, a situation unheard of before that time.

Also, the Modern Language Association made a move to accept technical communication into its fold in 1976. At its ninety-first convention, held in New York City, two speakers discussing technical communication were included on the program. The sessions were "Technical Communication and the Humanities," chaired by Professor Elizabeth Turpin of Clarkson Technological College, Potsdam, New York; and "Teaching Technical Writing: A Unique Challenge," chaired by Professor Paul V. Anderson of Miami University, Ohio (Carson 221). The inclusion of these sessions in the program revealed the growing acceptance of technical communication within the academic community of English departments.

Published in 1982, Connors' article forecasted the development of programs throughout this decade: "It now seems likely that technical communication will be an accepted field of study for English graduate degrees in many schools by the end of the decade" (349). His projection, like Hickok's, came true. The increased number of graduate programs from 1981 (8 programs) to 1985 (18 programs), as evidenced by the STC volumes, corroborates his position. The forthcoming edition, with an estimated 150 programs, will provide even more evidence substantiating the growth of technical communication as a specialty in more traditional academic departments.

1.3 Early Issues Surrounding the Programs

The 1972 STC International Technical Communication Conference included a panel titled "University Preparation for a Career in Technical Writing." Articles from this session were compiled in the first quarter 1973 volume of Technical Communication. Issues debated in this series of articles included the need for programs in technical communication, who is best suited to preparing technical communicators, and the ideal relationship between the university and industry in developing and maintaining programs. Including these articles in this discussion reveals some varying perspectives on early issues

surrounding the growing field of academic programs in technical communication; an understanding of these issues provides a solid foundation for understanding how programs have grown and developed.

One of the panel participants, Frederick Van Veen, then the director of corporate relations for Teradyne, Inc., in Boston, asserted that technical communication courses were taught in a vacuum and that the programs "originated because the moment that an occupation can be identified as distinct from all other occupations, education will rush to provide some means of certifying it" (3). He argued that it was the decline of the standards and curricula in colleges and not the emerging fields in technology and communication that needed to be analyzed. Engineers should be literate enough to write for themselves, and graduates from English programs should be required to take enough sciences to understand basic technology. The standards for university graduates should be raised to earlier heights rather than creating a new program that "promises to turn out a graduate who is a quasi-engineer and a quasi-writer" (3).

While Van Veen adamently stated his position, the logic was a little backward. Perhaps education had become less rigorous; however, society also changed, creating new needs. With the greater industrialization during and after World War II, the demand for writers increased. It would be ludicrous to ignore these changes and avoid preparing

students for the positions that emerged. Moreover, the market has changed dramatically since then. Our society has become information oriented; technical writers act not only as the pens of engineers but as the communicators for society. Van Veen's desire for universities to completely reverse trends regarding a broad versus a specialized education was neither practical nor realistic.

In his article, Van Veen showed a scornful attitude towards any university program in technical communication. He asserted that "since industry did not ask for technical writing curricula, it is not surprising that industry has shown almost total indifference to them" (3). While his opinion may have been representative when he wrote this statement, attitudes had shifted a decade later. The results of a 1984 survey of STC members showed that "74% agreed that `any educational program in technical communications will better prepare an entry-level technical communicator than on-the-job experience" (Anderson 1984, 7).

Another position in this series of articles came from James M. Lufkin, manager of professional publication, Honeywell, Inc., in Minneapolis. In "The Case Against Teaching Technical Writing in College," Lufkin listed the areas of competence necessary for a technical writer, including applicable technology, basic sciences, specialized terminology of the field, mechanics of publication, plain English, and specific formats and style of the employing

publication. He explained that most of these subjects could not be adequately taught in the university; they were, by definition, in the domain of the workplace. The only areas he felt should be taught in the university setting were basic sciences and plain English; however, he lamented that they were not being adequately taught by the system of large lecture classes run by overworked graduate students.

In effect, Lufkin and Van Veen argued two sides of the same position. Van Veen stated idealistically that the university should not create specialized programs to train students for a limited, practical field but should teach students to be literate and educated citizens; Lufkin argued that the university could not adequately teach students what they need to know for specific jobs. Van Veen held that a well-educated graduate could do whatever was necessary; Lufkin focused on industry's responsibility to educate further and train less than moderately skilled graduates.

Dr. John H. Mitchell, professor of English at the University of Massachusetts, Amherst, presented a conciliatory position in this series of arguments. In "Educators Cannot Go It Alone," Mitchell refuted the idea that universities should work only in the theoretical, asserting that "universities must either start giving courses that attract and serve students or else go out of business entirely" (4). He did not use the term "business" offhandedly; rather, he argued that universities must be

more aware of the needs of business and work with, rather than against, them. The recession of the early seventies presented the opportunity for teachers and practitioners to work together: "Current training programs in both academe and in industry are expensive, ineffective, and often redundant. This is not the moment to waste time and money" (4).

Mitchell explained that neither practitioners nor academics could, by themselves, properly train and teach competent communicators. Through the collaboration of universities and industry, students could learn both the theoretical foundations and the practical applications of technical communication. While Mitchell admitted that his article left wide open the issue of how, specifically, his model could be incorporated into programs, he stood by his premise that the only effective pathway was collaboration.

CHAPTER II

UNDERGRADUATE PROGRAMS

2.1 Introduction

Undergraduate programs in technical communication are more numerous than either graduate programs or certificate programs. As noted in the introduction, 37 four-year institutions granting bachelor's degrees were discussed in the third edition of STC's Academic Programs in Technical Communication, published in 1985. The 1976 edition included 10 programs; the 1981 edition discussed 13. The number continues to grow.

Table 1 lists 34 four-year schools that offer undergraduate programs in technical communication. These programs have been divided into five general categories according to the type of degree granted, although the names of the degrees vary somewhat from school to school: bachelor of arts in technical communication (or something along those lines); bachelor of science in technical communication; bachelor of arts with an emphasis or concentration in technical communication; bachelor of science with an emphasis or concentration in technical communication; and a minor in technical communication. Many of the schools offer more than one type of undergraduate degree; for example,

Table 1. Undergraduate Programs.

Program	Bachelor of Arts	Bachelor of Science	Bachelor of Arts/Emphasis	Bachelor of Science/Emphasis	Minor
1. University of Arkansas/ Little Rock	Technical and Professional Writing		English/Writing Emphasis		X
2. Bowling Green State University	Scientific Communication	Scientific Communication			
3. California State University, Long Beach			English/Option with Special Emphasis		
4. Carnegie Mellon	Professional Writing	Technical Writing			
5. University of Central Florida	Technical Writing and Editing				X
6. Clarkson University		Technical Communication			
7. Colorado State University	Technical Journalism				
8. University of Delaware			English/Concentration: Business and Technical Writing		
9. Eastern Washington University	English/Technical Communication				X
10. Florida Institute of Technology		Technical Communication			
11. Illinois Institute of Technology			English/Communication Concentration		X
12. Iowa State University				Journalism and Mass Communication/Science and Technical Writing Emphasis	
13. Louisiana Tech University	Technical Writing				X
14. University of Maine			Concentration: Technical Writing	Concentration: Technical Writing	
15. Mankato State University				English/Concentration: Technical Writing	
16. Miami University			English/Concentration: Business and Technical Writing		
17. Michigan Technological University	Scientific and Technical Communication	Scientific and Technical Communication			
18. University of Minnesota		Scientific and Technical Communication			
19. University of Nebraska Medical Center		Biomedical Communication			

Table 1. Continued

Program	Bachelor of Arts	Bachelor of Science	Bachelor of Arts/Emphasis	Bachelor of Science/Emphasis	Minor
20. University of New Mexico			English/Concentration: Professional Writing		X
21. New Mexico Institute of Mining and Technology		Technical Communication			
22. New Mexico State University					X
23. New York Institute of Technology		Technical Writing			
24. North Carolina State University			English/Writing, Editing Option		
25. Northeastern University					X
26. Northeast Louisiana University	Technical Communication				
27. University of North Texas					X
28. Oklahoma State University			English/Technical Writing Option		
29. Pennsylvania State University					X
30. Polytechnic University		Journalism and Technical Writing			
31. San Diego State University					
32. Texas A&M University					X
33. Texas Technical University			English/Specialization: Technical Communication		X
34. University of Washington	Scientific and Technical Communication	Scientific and Technical Communication			

Michigan Technological University gives students the option of taking either a B.A. or a B.S. in Scientific and Technical Communication. The University of Arkansas at Little Rock offers both a B.A. in Technical and Professional Writing and a B.A. with a Writing Emphasis.

2.2 Bachelor of Arts in Technical Communication

While all of the following programs lead to a B.A. in Technical Communication or some variation of that degree, the actual curricula are not as similar as one might expect. First, a brief description lists the courses and other requirements for each program. Only the specific requirements that directly relate to the technical communication program are listed; general university requirements are not given. A comparison of the programs follows.

University of Arkansas at Little Rock

Bachelor of Arts in Technical and Professional Writing

Department: English and Journalism

Requirements:
- 3 h Expository Writing
- 3 h Technical Writing
- 9 h upper-level writing courses, including optional 3-h internship
- 3 h Writing for Mass Media
- 3 h Reporting Principles
- 3 h News Editing
- 3 h Feature Writing
- 3 h Magazine Journalism

Bowling Green State University

Bachelor of Arts in Scientific and Technical Communication

Department: English, College of Arts and Sciences

Requirements:
- Communications Core (including internship)
- Computer Science/Technology
- Graphics and Design
- Project Management
- Science and Technology Cognate

Carnegie Mellon University

Bachelor of Arts in Professional Writing

Department: English, College of Humanities and Social Sciences

Requirements:
- 4 English Core courses (1 creative writing and 3 literary theory)
- 4 advanced writing courses, including optional internship
- 1 rhetoric or linguistics course
- professional concentration in area outside of English (e.g., graphics, management)

University of Central Florida

Bachelor of Arts in Technical Writing and Editing

Department: English, College of Arts and Sciences

Requirements:
- 21 h foundation studies (literature and writing)
- 13 h basic writing and technical writing
- 24 h advanced technical writing and editing

Colorado State University

Bachelor of Arts in Technical Journalism

Department: Technical Journalism

Requirements:
- 32 h journalism, technical writing, editing, and related courses
- 21 h technical or scientific option

9 h composition, communication, and reasoning skills
optional internship

Eastern Washington University

Bachelor of Arts in English/Technical Communications

Department: English

Requirements: 14-15 h technical writing and editing
5-20 h internship (10 h recommended)
35 h literature and language
16-21 h electives (e.g., computers, graphics, oral communication, proposal writing, public relations)

Louisiana Tech University

Bachelor of Arts in Technical Writing

Department: English, College of Arts and Sciences

Requirements: 21 h technical writing, optional internship
9 h English composition and literature
47 h science, engineering, economics, and psychology

Michigan Technological University

Bachelor of Arts in Scientific and Technical Communication

Department: Humanities

Requirements: 15-18 quarter h technical writing, editing, and graphics
6 h video, radio laboratory
6-9 h special projects
41 h core area (computer science, business, chemistry, engineering, etc.)
9 h composition
15 h in courses from a single department

Northeast Louisiana University

Bachelor of Arts in Technical Communications

Department: English

Requirements:
- 21 h technical writing, editing, and publication and business communication
- 18 h literature, composition, vocabulary, and other English courses
- 6 h speech and interpersonal communication
- 6 h journalism
- 12 h computer science and keyboarding
- 16 h science

University of Washington

Bachelor of Arts in Scientific and Technical Communication

Department: General Studies, College of Arts and Sciences

Requirements:
- 20 quarter h humanities
- 20 h social sciences
- 20 h natural sciences
- 36 h scientific and technical communication, including required internship
- 24 h subject-area courses

In six of the ten programs, English is the department granting the degree; at Arkansas, it is both English and journalism; at Colorado State, it is technical journalism; at Michigan Technological, it is the humanities department; and at Washington it is the General Studies Program.

The writing and editing courses included in the various programs cover a wide spectrum. All sequences incorporate a basic technical writing class and another course in technical editing. Some programs then turn to journalism courses to provide more writing: Arkansas requires 15 hours of journalism courses, and Colorado State's technical journalism degree stems from the journalism department. Other programs rely on composition and advanced writing

courses in the English department to supplement the technical writing courses: Carnegie Mellon includes a creative writing course, and Northeast Louisiana requires writing classes from the established English department offerings. The value of such courses in a technical communication curriculum has been debated; some opponents feel that traditional journalism or creative writing courses have little to do with technical communication. The purpose here is not to judge the value of the programs, though, but to illustrate the variety among programs.

In addition to writing and editing courses, the programs require students to develop different types of skills. Some programs, such as Carnegie Mellon, Central Florida, Eastern Washington, and Northeast Louisiana, focus many hours on courses in English literature and language. Other programs have developed supporting courses specifically for a technical writing program. For example, students at Central Florida can choose from courses like "Technical Documentation I, II, and III," "Science and the Lay Reader," "Techniques of Technical Publication," "Graphics for the Technical Writer," and "Community Relationships and the Technical Writer." Options at the University of Washington include "Style in Scientific and Technical Communication," "Writing for Publication," and "Professional Practice." At Bowling Green, required support courses include "Graphics and Design" and "Project

Management"; Michigan Tech prepares students in the areas of video and radio production. Another area of development for some schools is speech: Northeast Louisiana requires 6 hours of speech and interpersonal communication, and one of the electives at Eastern Washington is "Oral Communication."

Nearly all programs in technical communication now offer their students the opportunity to participate in an internship. In some programs, the internship is required; some examples are Bowling Green, Eastern Washington, Northeast Louisiana, and Washington. In other programs, the internship is optional; these programs include Arkansas, Carnegie Mellon, and Colorado State. Internships can be run in many different ways, some earning academic credit, some earning wages, and some earning both. The merits of the various types of internships can be debated; however, the importance of such practical experience in a technical communication program is unquestioned.

All of the programs require the basic science and social science courses typical in a liberal arts program; several of the programs require much more. Bowling Green's program requires a "Science and Technology Cognate," which is the equivalent of a minor, in the student's area of choice. Colorado State's "Technical or Scientific Option" parallels Bowling Green's cognate, as does the "core area" requirement at Michigan Tech. The program at the University of Washington also includes extensive sciences. The

"professional concentration" at Carnegie Mellon does not have to be scientific, which correlates with their degree title of professional writing (as opposed to scientific or technical communication).

2.3 Bachelor of Science in Technical Communication

Ten of the 34 schools discussed here offer a B.S. in Technical Communication. Of these ten, four also offer a B.A. degree: Bowling Green, Carnegie Mellon, Michigan Technological, and the University of Washington. At Washington, students can attain either a B.S. in Technical Communication or a B.S.E. in engineering with courses in technical communication. The two Carnegie Mellon programs are fairly similar, both requiring four English core courses, four advanced writing courses, and one rhetoric or linguistics course. The difference between the programs lies in the requirements outside of the English department: the B.S. degree requires more sciences and technical electives, while the B.A. degree enables students to take a professional concentration in an area such as graphics or management. As with Carnegie Mellon, the primary difference between the B.A. and the B.S. degrees at Bowling Green, Michigan Tech, and Washington rests in the area the student chooses to study as a concentration outside of the English and communication classes.

The curriculum descriptions for all of the schools offering a B.S. in Technical Communication follow, again in alphabetical order. After that, the requirements of the programs are compared and contrasted.

Bowling Green State University

Bachelor of Science in Scientific and Technical Communication

Department: English, College of Arts and Sciences

Requirements:
- Communications Core (including internship)
- Computer Science/Technology
- Graphics and Design
- Project Management
- Science and Technology Cognate

Carnegie Mellon University

Bachelor of Science in Technical Writing

Department: English, College of Humanities and Social Sciences

Requirements:
- 4 English Core courses (1 creative writing and 3 literary theory)
- 4 advanced writing courses, including optional internship
- 1 rhetoric or linguistics course
- 1 course each from biology, physics, chemistry, computer science, statistics and calculus; and second calculus or statistics course
- 2 courses in visual design
- 4 additional technical electives from above fields or engineering

Clarkson University

Bachelor of Science in Technical Communication

Department: Technical Communication

Requirements:
- 3 h engineering
- 3 h management

6 h science
6 h computer science
6 h mathematics
3 h additional science, math, or computers
30 h technical communications
15 h professional elective concentration (e.g., computer science, science, engineering, management, mathematics)
30 h free electives
required internship

Florida Institute of Technology

Bachelor of Science in Technical Communication

Department: Humanities

Requirements: 63 quarter h communication courses, including Speech, Desk Top Publishing, Graphics, Communication in Mass Society, Research Methods, and optional internship
9 h engineering
9 h mathematics
6 h computer science
9 h science
9 h management
15 h technical or scientific elective

Michigan Technological University

Bachelor of Science in Scientific and Technical Communication

Department: Humanities

Requirements: 15-18 quarter h technical writing, editing, and graphics
6 h video, radio laboratory
6-9 h special projects
41 h core area
9 h composition
15 h in courses from a single department

University of Minnesota

Bachelor of Science in Scientific and Technical Communication

Department: Rhetoric

Requirements: 70 quarter h in professional communication: writing/editing, oral communication, visual communication, communication systems, theory and research
20 h scientific or technical emphasis
27 h general communication, language and symbolic systems

New Mexico Institute of Mining and Technology

Bachelor of Science in Technical Communication

Department: Humanities

Requirements: 35 h writing, editing, word processing, and speech
8 h mathematics (differential calculus or higher)
10 h physics (calculus-based)
16 h in biology, chemistry, and geology (with 8 h in chemistry)
12 h in either one area of science or engineering or in several areas (in courses above general requirement)

New York Institute of Technology

Bachelor of Science in Technical Writing

Department: English, School of Humanities

Requirements: 21 h technical writing
25 h science and engineering courses
30 h interdisciplinary core of courses in business, economics, communication, arts, and English

Polytechnic University

Bachelor of Science in Journalism and Technical Writing

Department: Humanities and Communications, Division of Arts and Sciences

Requirements: 33 h communication courses, including Report Writing I and II, Writing News for TV and Radio, Reporting and Writing About Science and Technology, Graphics and Production Techniques, and Writing

Operation and Maintenance Manuals
12 h sciences
8 h mathematics
3 h computer science
22 h interdisciplinary science, technology, society core curriculum

University of Washington

Bachelor of Science in Scientific and Technical Communication

Department: General Studies Program, College of Arts and Sciences

Requirements:
20 quarter h humanities
20 h social sciences
20 h natural sciences
36 h scientific and technical communication, including required internship
24 h subject-area courses

Bachelor of Science/Bachelor of Science in Engineering

Department: College of Engineering

Requirements:
23 quarter h mathematics
23 h natural sciences
12 h functional techniques
16 h engineering science
35 h upper-level science, math, engineering (for B.S.)
66 h upper-level science, math, engineering (for B.S.E.)
31 h scientific and technical communication, including internship (B.S.)
19 h scientific and technical communication, including internship (B.S.E.)

Of these eleven programs, only three are housed in English departments: Bowling Green, Carnegie Mellon, and New York Institute of Technology. It is interesting to note that two of these, Bowling Green and Carnegie Mellon, offer parallel B.A. degrees. Florida Institute of Technology,

Michigan Tech, and New Mexico Institute of Mining and Technology offer programs based in the humanities department, while Polytechnic's degree is awarded by the departments of humanities and communications. Minnesota's program is based in the rhetoric department; Clarkson has established a technical communication department. Students at the University of Washington can pursue their degree through the department of their choice in the General Studies Program, or, in Washington's other program option, through the college of engineering.

As one would expect, these B.S. programs require students to take more hours in science areas than do the B.A. degrees. Some of these schools specify that students take the equivalent of a minor in a single technical or scientific area: Bowling Green has the "Science and Technology Cognate," Florida Institute requires 15 quarter hours in a technical scientific elective, Michigan Tech has 15 quarter hours in courses from a single department, Minnesota requires a 20-quarter-hour scientific or technical emphasis, and Clarkson requires a 15-hour professional elective concentration. Other programs, rather than requiring specialization in a single area, encourage students to take courses from a wide range of technical areas; for example, Carnegie Mellon's curriculum includes one course each from biology, physics, chemistry, computer science, statistics, and calculus, as well as four

additional technical electives. New Mexico Institute specifies hours in mathematics, physics, biology, chemistry, and geology; in addition, students can choose an area of specialization or advanced courses in several science or engineering areas. Both the New York Institute and Polytechnic also encourage students to take classes from several scientific and technical areas. While programs at Clarkson and Florida Institute include several courses in one technical area, they also require courses in a range of fields, including engineering, management, computer science, mathematics, and other sciences. Both programs at the University of Washington demand both specialization in one area and a broad base of other scientific courses.

The communication and writing courses in these programs are less likely to be from traditional English department offerings than those in the B.A. programs. Only Carnegie Mellon and New York Institute of Technology require English courses not specifically oriented towards technical communication (other than general university requirements); both these programs are housed in the English department. All programs include technical writing and editing classes. Beyond these, additional communication courses in different programs have different emphases. Florida Institute offers a variety of practical and theoretical courses, including "Desk Top Publishing," "Research Methods," and "Communication in Mass Society." Minnesota's program

includes strategic and analytical courses in audience analysis, media selection, communication strategies, organizational communication, interviewing, and teaching technical writing. Polytechnic's program, as its title suggests, has a journalistic emphasis, with courses like "Writing News for TV and Radio"; additional practical courses include "Report Writing I and II" and "Writing Operation and Maintenance Manuals."

Internships are generally available, as is the case with B.A. programs. Bowling Green, Clarkson, Minnesota, New Mexico Tech, and Washington require internships of their technical communication students. Students at Carnegie Mellon, Florida Institute, and New York Institute have the option of participating in an internship program.

2.4 Bachelor of Arts with an Emphasis in Technical Communication

Of the 34 schools included in this discussion of undergraduate programs, ten offer a B.A. degree with an Emphasis or Concentration in Technical Writing. The titles of the programs are nearly as numerous as the programs themselves, as are the varieties of curricula. Only one of these schools, the University of Arkansas at Little Rock, also offers a major degree in the area: a B.A. in Technical and Professional Writing. These two programs differ

considerably, as the technical writing degree requires five courses from the journalism department as well as five upper-level English writing courses. The B.A. in English with a Writing Emphasis requires only five upper-level writing courses in addition to literature and language classes.

A comparison and analysis of the ten programs follows the listing of specific requirements for each school.

University of Arkansas at Little Rock

Bachelor of Arts in English with a Writing Emphasis

Department: English

Requirements:
- 6 h English literature
- 3 h American literature
- 3 h History of the English Language or Grammar and Syntax
- 15 h upper-level writing courses (including optional 3-h internship)

California State University, Long Beach

Bachelor of Arts in English, Option with a Special Emphasis

Department: English

Requirements:
- 7 h literary analysis
- 34 h approved courses in technical writing, Proposal Writing, Manual Writing, Writing in Science and Technology, linguistics, or literature

University of Delaware

Bachelor of Arts in English with a Concentration in Business and Technical Writing

Department: English

Requirements: 24 h in English major in survey courses and various literary periods, in genres and literary criticism
12 h business and technical writing, rhetoric, publication, and internship

Illinois Institute of Technology

Bachelor of Arts in English, Communications Concentration

Department: Humanities

Requirements: 30 h Technical Writing, Communications, Editing, Design and Graphics, and internship
8 h math and computer science
12 h natural science or engineering
12 h social science

University of Maine

Bachelor of Arts with a Concentration in Technical Writing (certificate)

Department: An undergraduate from any department can elect to concentrate in technical writing

Requirements: 3 h Technical Writing
3 h Advanced Technical Writing
3 h field experience course
3 h another advanced writing course

Miami University (Ohio)

Bachelor of Arts in English with a Concentration in Business and Technical Writing

Department: English

Requirements: Technical Writing
Advanced Technical Writing
Newspaper Reporting
6 h additional writing courses
3 h nonwriting communication course
12 h professional area courses
15 h literature

University of New Mexico

Bachelor of Arts in English, Professional Writing Concentration

Department: English

Requirements:
- 13-16 h English department writing courses, including 1-h internship
- 18-21 h language and literature, including linguistics, literature surveys, and upper-division literature seminars
- 9 h upper-division courses in professional, technical, or scientific areas

North Carolina State University

Bachelor of Arts in English with a Writing-Editing Option

Department: English

Requirements:
- 21 h writing, editing, rhetoric, and linguistics
- 15 h literature
- 15 h technical minor

Oklahoma State University

Bachelor of Arts in English (Technical Writing Option)

Department: English

Requirements:
- 18 h technical writing and editing
- 3 h grammar
- 3 h linguistics
- 9 h lower-division English
- 13 h upper-division non-English electives

Texas Tech University

Bachelor of Arts in English, Technical Communication Specialization

Department: English

Requirements:
- 6 h advanced rhetoric
- 3 h sophomore literature
- 12 h technical communication

6 h in art, computer sciences, or speech
9 h advanced English electives
18 h minor field

As could be expected, programs that lead to a B.A. with an Emphasis in Technical Writing are generally housed in English departments, with English as the major area. In fact, nine of the ten programs included here lead to a B.A. in English; at the University of Maine, students can take the concentration in technical writing as an adjunct to any major departmental emphasis.

The requirements in these programs as to the number of hours in technical communication vary greatly. The program at the University of Maine, which awards students a certificate, requires only 12 hours of coursework including an internship, as does the program at the University of Delaware. Arkansas requires 18 hours in general writing and language courses; North Carolina State demands 21 hours, including "News and Article Writing" and "Advanced Composition and Rhetoric." The program at Illinois Institute of Technology demands 30 hours in communication courses. As stated earlier, the purpose here is not to judge the merits of individual programs but to demonstrate the vast differences between programs, even those that grant similar degrees.

All schools include basic science, math, and social science courses to fulfill the general education

requirements. Beyond these, four of the programs require students to take additional technical and scientific courses. Miami University demands 12 hours in the student's chosen professional area. New Mexico specifies 9 hours in upper-division courses in professional, technical, or scientific areas. North Carolina State demands 15 hours in a technical minor; Texas Tech requires 18 hours in a minor field.

Internships are an integral part of most programs. Six of these ten programs require students to participate in an internship: California State, Delaware, Illinois Institute of Technology, Maine, New Mexico, and Oklahoma State. Other programs include internships as an option for students.

2.5 Bachelor of Science with an Emphasis in Technical Communication

Of the 34 universities included in this discussion, only three offer programs that lead to a B.S. with an Emphasis in Technical Communication. At the University of Maine, students can choose between a B.A. or a B.S. degree. The concentration itself comprises four courses that students take in addition to the requirements for their major.

Iowa State University

Bachelor of Science in Journalism and Mass Communication with Science and Technical Writing Emphasis

Department: Journalism and Mass Communication

Requirements:
- 32 h journalism and mass communication
- 3 h communication
- 24 h science minor

University of Maine

Bachelor of Science with a Concentration in Technical Writing

Department: All undergraduates can elect to concentrate in technical writing

Requirements:
- 3 h Technical Writing
- 3 h Advanced Technical Writing
- 3 h field experience course
- 3 h another advanced writing course

Mankato State University

Bachelor of Science in English with a Concentration in Technical Writing

Department: English

Requirements:
- 31 quarter h technical communication, including internship
- 12 h literature, linguistics, or other writing courses
- 12 h visual communication and computer science
- 21-31 h technical or scientific minor

These three programs represent the vast disparity that can exist among seemingly similar curricula. While all three lead to a B.S. with an emphasis or concentration in technical writing, their requirements barely resemble each other. The Iowa State program is housed in the department

of journalism and mass communication; Mankato State's is housed in the English department; and the technical writing courses for Maine's program are in the English department.

The 31 quarter hours in technical communication at Mankato State include core courses in technical writing, editing, researching, and rhetorical theory; support courses in visual communication and computer science supplement these. The 33 hours of journalism and mass communication at Iowa State include magazine and newspaper writing, editing, and production and science writing. Maine's program is much less extensive, requiring only 12 hours in writing and an internship. Mankato State's program also requires an internship.

Both Iowa State and Mankato State require a technical or scientific minor, 15 hours at Iowa and 21-31 quarter hours at Mankato State. Maine's concentration does not specify a minor, but as it is an adjunct program it is assumed that the students will have majors in appropriate fields.

2.6 Minor in Technical Communication

The following discussion includes 12 programs that offer a minor in technical communication. Eleven of these schools offer other degrees in technical communication, some undergraduate and some graduate; therefore, they are able to

draw students for courses from both tracks. Texas A&M offers only a minor in writing specialization, which includes 18 hours of coursework and earns students a certificate.

The descriptions of each school's curriculum for the minor are followed by a comparison of these programs.

University of Arkansas at Little Rock

Minor in Writing

Department: English

Requirements: 18 h upper-level writing courses
optional internship

University of Central Florida

Certificate and Minor in Technical Writing

Department: English

Requirements: 8 required courses in advanced composition, technical documentation, and technical publication

Eastern Washington University

Minor in English/Technical Communications

Department: English

Requirements: 5 quarter h literature
20 h writing;optional internship

Illinois Institute of Technology

Minor in Technical Communication

Department: Humanities

Requirements: 30 h in technical writing, communications, editing, design and graphics, and internship

Louisiana Tech University

Minor in Technical Writing

Department: English

Requirements: 21 h technical writing, including optional internship

University of New Mexico

Minor in Professional Writing (for majors in departments other than English)

Department: English

Requirements: 9 h English department writing courses
9 h English, journalism, or theater arts
1 h optional internship

New Mexico State University

Minor in Professional Writing

Department: English

Requirements: 6 h literature
3 h technical writing
9 h writing courses and Advanced Composition

Northeastern University

Minor in Technical Communications

Department: English

Requirements: 12 quarter h technical or professional writing
4 h speech communication
4 h graphic design
4 h computer science
8 h additional computer science or sciences

University of North Texas

Certificate for Minor in Technical Writing

Department: English

Requirements: 21 h technical communication, including optional internship

Pennsylvania State University

Minor in Technical Writing

Department: English

Requirements: 18 h technical writing, editing, nonfiction writing, and internship

Texas A&M University

Certificate for Minor in Writing Specialization

Department: English

Requirements:
3 h Argumentation
3 h Technical Writing
3 h Technical Editing
3 h Technical Speech
6 h electives, including computer science
optional internship

Texas Tech University

Technical Communication Minor

Department: English

Requirements:
6 h advanced college rhetoric
12 h technical communication

Most of these minor programs are designed to serve all students in the university: those with an English, communications, or journalism major who wish to specialize their communication skills to technical fields or those with

any other major who wish to develop knowledge and skills in technical communication to enhance the worth of the degrees in their major fields.

Because of the limited number of hours in a minor, some programs require only advanced writing and editing courses; Arkansas, North Texas, Pennsylvania State, and Texas Tech are set up this way. Other programs require a couple of literature courses in addition to the technical writing and editing sequence, for example, Eastern Washington and New Mexico State. Trying to cover a broader base of the different aspects of technical communication, some programs include speech, graphics and design, computer science, and a variety of other areas. More comprehensive programs include Central Florida, Illinois Institute of Technology, Louisiana Tech, New Mexico, Northeastern, and Texas A&M.

As with the other categories of programs, minor programs generally offer students the opportunity to participate in some sort of internship. Programs that require an internship include Illinois Institute of Technology and Pennsylvania State.

One other category of undergraduate programs exists: the certificate program. While some of the minor programs discussed in this section do award students a certificate, they were included because they are considered minors by the schools that offer them. In some cases, it is only the title of a program that would distinguish a minor from a

certificate program. One difference is that many of the certificate programs around the country are established in two-year schools or junior colleges. These programs serve a large number of students and provide the field of technical communication with many skilled practitioners; however, it would be beyond the scope of this study to include this large category of programs.

CHAPTER III

GRADUATE PROGRAMS

3.1 Introduction

The first degree program in technical communication was a graduate program at Rensselaer Polytechnic Institute, which graduated its first student in 1955 (Anderson 1984). STC's 1976 directory of Academic Programs in Technical Communication included discussions of 6 schools offering master's degrees in technical writing/editing; this number grew to 8 in the 1981 directory and to 18 by 1985.

As with the chapter on undergraduate programs, this chapter aims to provide an understanding of the range of programs currently coexisting. Certainly, more universities offer graduate programs in technical communication than those discussed here; however, this sample serves to define the general categories and limits of the variety of programs. Also, because these programs are fairly well established, most of them operating for a number of years, other schools trying to develop programs often look to them for guidance. Therefore, the general patterns we see here perpetuate themselves by example in many of the newer programs that are emerging.

Table 2 lists 21 schools that offer graduate degrees in technical communication. As with the table listing undergraduate programs, the programs have been divided into categories according to the type of degree granted, allowing for differences in the specific titles of programs: master of arts in technical communication; master of science in technical communication; master of arts with an emphasis in technical communication; and master of science with an emphasis in technical communication. Most schools offer only one type of graduate degree in this area. However, at Eastern Washington students can work towards either a master of science in communication or a master of arts in English with a technical and professional writing emphasis. Iowa State also provides an option: a master of arts in English with a business and technical communication emphasis or a master of science in journalism and mass communication with a science writing emphasis. The only school included in this discussion that currently offers a Ph.D. program is Rensselaer Polytechnic, which has the oldest Ph.D. program in the field. Several other universities have developed doctoral programs as well, but this comparison and analysis will be limited to programs leading to a master's degree.

Table 2. Graduate Programs.

Program	Master of Arts	Master of Science	Master of Arts/Emphasis	Master of Science/Emphasis
1. University of Arkansas/ Little Rock	Technical and Expository Writing			
2. Bowling Green State University			English/Technical Writing	
3. Carnegie Mellon	Professional Writing			
4. Colorado State University		Technical Communication		
5. Drexel University		Technical and Science Communication		
6. East Carolina University			English/Technical and Professional Communication	
7. Eastern Washington University		Communications	English/Technical and Professional Communication	
8. Iowa State University			English/Business and Technical Communication	Journalism and Mass Communication/Science Writing
9. Mankato State University			English/Writing	
10. Miami University	Technical and Scientific Communications			
11. Michigan Technological University		Rhetoric and Technical Communication		
12. University of Minnesota		Technical Communication		
13. New Mexico State University			English/Technical and Professional Writing	
14. North Carolina State University		Technical Communication		
15. University of North Texas			English/Technical Writing Option	
16. Northeastern University	Technical and Professional Writing			
17. Oklahoma State University			English/Technical Writing Option	
18. Pennsylvania State University			Writing/Technical Writing	
19. Polytechnic University		Specialized Journalism		
20. Rensselaer Polytechnic		Technical Communication or Communication and Rhetoric		
21. University of Washington		Scientific and Technical Communication		

3.2 Master of Arts in Technical Communication

None of the four programs leading to an M.A. in technical communication in this discussion share a title, but the programs do have other elements in common. All four also offer undergraduate degrees in the field; all programs share some of the courses between the two degrees. Such similarities between undergraduate and graduate programs are not uncommon; however, they do pose some problems in trying to distinguish between the two degrees from different universities. This issue is one that will be examined more closely in the concluding chapter.

A comparison of the outstanding characteristics of the programs follows the curriculum descriptions.

University of Arkansas at Little Rock

Master of Arts in Technical and Expository Writing

Department: English
Requirements:
- 3 h Composition Theory
- 3 h Rhetorical Theory
- 3 h Linguistic Theory
- 9 h in the technical or the expository track
- 9 h cognate courses
- 6 h final project (thesis, applied writing project, or extensive internship with written reports)

Carnegie Mellon University

Master of Arts in Professional Writing

Department: English

Requirements: 3 advanced courses in professional/technical writing

2 visual design courses, including
Fundamental Graphic Design
1 course in rhetoric
1 course in linguistics
1 course in computers and writing
3 or 4 electives
required internship

Miami University of Ohio

Master of Technical and Scientific Communication

Department: English, College of Arts and Sciences

Requirements: Introduction to Technical and Scientific Communication
Organizational Communication
Communication Graphics
Linguistics for Technical and Scientific Communications
Introduction to Rhetoric
Technical and Scientific Writing
Technical and Scientific Editing
Managing Technical and Scientific Communication Departments, Publications, and Policies
Electives (3) (e.g., management, technical or scientific field, or non-print media)
internship (one semester)

Northeastern University

Master of Technical and Professional Writing

Department: English, College of Arts and Sciences

Requirements: 9 quarter h technical and professional writing
3 h linguistics
3 h research materials
3 h project
6 h writing/literature electives
3 h computer science language
3 h business and professional speaking
3 h graphic design
9 h one technical, scientific, or professional area

The English departments at each of these four schools house the technical writing programs. All of them require technical writing and editing courses similar to those that form the basis for most undergraduate programs. In addition, most require courses in rhetoric and/or linguistics to provide some theoretical basis for the writing and editing courses. Arkansas includes theory courses in composition, rhetoric, and linguistics; Carnegie Mellon requires courses in rhetoric and linguistics; Miami includes an introduction to rhetoric and a specialized course in "Linguistics for Technical and Scientific Communications"; and Northeastern requires a course in linguistics.

Of these four programs, three require some sort of cognate or emphasis in a scientific, technological, or professional area of the student's choice; generally, this amounts to three courses in one area. Only Carnegie Mellon's program does not require this. Another practical aspect, the internship, is required at Carnegie Mellon and Miami. At the University of Arkansas, students can choose to do an internship, an applied writing project, or a thesis to fulfill the final project requirement. Northeastern's program serves many professionals already working in related fields, so a required internship would be inappropriate for these students. For students not in such a position, the

program offers the opportunity to participate in an internship.

In addition to the writing and editing courses, theory courses, internships, and cognates, different programs emphasize different supporting skills. Two programs, Carnegie Mellon and Northeastern, require at least one course in computer science. Miami and Northeastern each require one course in graphics; Carnegie Mellon requires two. Northeastern's course in business and professional speaking is mandatory, as is the course in research materials. Miami's program includes such management-focused courses as "Organizational Communication" and "Managing Technical and Scientific Communication Departments, Publications, and Policies."

3.3 Master of Science in Technical Communication

Of the undergraduate programs discussed in the last chapter, those leading to a B.A. and those leading to a B.S. were about equal in number; however, at the graduate level considerably more programs culminate in an M.S. than an M.A. Nine M.S. programs are included in this discussion; only four M.A. programs were discussed. Of the nine schools offering an M.S. in technical communication, seven of them also offer an undergraduate degree in the field; Rensselaer and Drexel offer only graduate degrees.

Colorado State University

Master of Science in Technical Communication

Department: Technical Journalism

Requirements:
- 14 h Required Core: communication research and evaluation methods, process and effects of technical communication, managing communication systems, research and thesis
- 6 h electives
- 6 h journalism electives
- 6 h outside work, including statistics

Drexel University

Master of Science in Technical and Science Communication

Department: Humanities and Communications, College of Humanities and Social Sciences

Requirements:
- 3 quarter h Technical Writing
- 3 h Science Writing
- 3 h Technical and Science Editing
- 3 h Photography or Graphics
- 3 h Telecommunications or Film
- 3 h Theories of Communication and Persuasion
- 3 h Message Design and Evaluation
- 3 h Technology, Science, Literature, and the Arts
- 3 h Ethics in Technical and Science Communication
- 3 h The Practice of Technical and Science Communication
- 15 h electives
- approved portfolio
- optional internship

Eastern Washington University

Master of Science in Communications

Department: Interdisciplinary

Requirements:
- 4 quarter h Communication Theory
- 6 h Communication Modes
- 6 h Information Systems
- 6 h Management
- 4-5 h Research Methods

3-6 h thesis or research project
2 h Capstone Seminar
30-33 h program options

Michigan Technological University

Master of Science in Rhetoric and Technical Communication

Department: Humanities

Requirements:
3 quarter h writing and editing or advanced scientific and technical writing
3 h composition theory
3 h modern rhetorical theory
3 h visual communication
3 h communication theory
6 h minimum advanced humanities courses
12 h maximum undergraduate humanities
9-15 h thesis or
3-9 h project

University of Minnesota

Master of Science in Technical Communication

Department: Rhetoric
Requirements:
20-28 quarter h rhetoric, requiring "Theory and Practice in Designing Messages," audience analysis, and media selection
8 h related area
16 h thesis credits or
8 h in Plan B project credits
required internship

North Carolina State University

Master of Science in Technical Communication

Department: English

Requirements:
12 h required courses:
advanced technical writing and editing
writing theory and research
rhetoric of science and technology
organizational communication
9 h restricted electives in linguistics, technical methods, and communication media

3 h thesis
required internship or approved work experience

Polytechnic University

Master of Science in Specialized Journalism

Department: Humanities and Communications, Division of Arts and Sciences

Requirements:
- 3 h Libel Law and Press Ethics
- 3 h Special Project in Professional Writing
- 12 h communication courses, including Style for Professional Writing, Proposal Writing, Technology and Medicine, Graphics, and Oral Technical Communication
- 18 h electives in technical subject, computers, and other writing courses

Rensselaer Polytechnic Institute

Master of Science in Technical Communication

Master of Science in Communication and Rhetoric

Department: Language, Literature, and Communication, School of Humanities and Social Sciences

Requirements:
- 3 h theory (communication, rhetorical, or literary)
- 3 h writing and editing
- 3 h computers in technical communication
- 3 h publications practicum or advanced visual communication
- 3 h writing in industry or writing for publication
- 15 h electives

M.S. in Communication and Rhetoric: substitute Introduction to Communication Research and Directed Research Project for last two required courses

University of Washington

Master of Science in Scientific and Technical Communication

Department: Engineering

Requirements: 3 quarter h Theoretical Dimensions of Technical Communication
3 h Computers and Information Management in Technical Publications
3 h Document Design
3 h Technical Communication Systems: Analysis, Design, and Management
3 h elective communication course
elective courses in relevant fields
thesis hours

While all of the M.A. programs are housed in English departments, only one of the M.S. programs emanates from a traditional English department: North Carolina State University. Colorado State offers a degree through the technical journalism department. The programs at Drexel and Polytechnic work through the humanities and communications department; at Michigan Tech, it is the humanities department. Rensselaer's program is housed in the department of language, literature, and communication; Minnesota's program is in the rhetoric department; and Washington's program is in the engineering department. The interdisciplinary program at Eastern Washington includes courses from nine departments, including applied psychology, communication studies, computer science, education, and management information systems. One reason for the variety of departments housing programs is that many of these schools offering M.S. degrees are engineering and technological universities rather than traditional liberal arts schools; therefore, they are less likely to have traditional English departments.

Many of these programs have strict entrance requirements, expecting more knowledge and experience on the part of the students than typical entry-level programs. For example, students entering Colorado State's program who have not taken undergraduate journalism writing courses or have not had professional communication experience must take writing, editing, and production courses that do not count towards the requirements for the M.S. degree. Entrance requirements for Minnesota's program include 12 credits in advanced communication courses and 30 credits in science, technology, and/or engineering; students are allowed to take some courses to fulfill these requirements while beginning work towards the M.S. degree. To be admitted to the master's program at Washington, students must either hold a bachelor's degree in engineering or science or have a minimum of three years professional technical communication experience. In addition, applicants must have courses or experience in technical writing, editing, and production.

Composition theory, communication theory, rhetorical theory, and linguistics are common courses throughout these programs; most require at least one theory course, others require several. Washington has one course that integrates these different areas: "Theoretical Dimensions of Technical Communication." These courses corroborate the opinion of many that a graduate program should incorporate more theoretical elements, while an undergraduate program should

emphasize preparing students with the practical skills of a technical communicator.

Most of these programs do not require a concentration or cognate in a scientific or technological field. Rather than indicating an oversight on the part of the program developers, this situation results from the programs being geared towards a certain type of student. As discussed earlier, these programs demand specific, extensive education and work experience from their applicants. Students entering these M.S. programs in technical communication generally have an undergraduate degree in a scientific area, which would make an additional requirement at the graduate level unnecessary. Likewise, because most students have previous or concurrent work experience, internships are optional in many of the programs.

Some programs demand a traditional thesis from students; for example, North Carolina State and Washington. At Eastern Washington, Michigan Tech, and Minnesota, students can choose between writing a thesis or working on an approved project in technical communication. At Drexel, students must submit a portfolio of their work for approval.

3.4 Master of Arts with an Emphasis in Technical Communication

Nine programs offering an M.A. with an emphasis in technical communication are included in this discussion. Eight of these lead to a major degree in English; at Pennsylvania State the major degree is in writing. Of the nine programs, only East Carolina does not offer some variation of the technical writing degree at the undergraduate level, either as a major, an emphasis, or a minor.

A comparison and analysis of these M.A. programs will follow a listing of their curricula.

Bowling Green State University

Master of Arts in English with an Emphasis in Technical Writing

Department: English

Requirements: Communications Core (including writing and editing and internship)
Computer Science
Science and Technology Cognate

East Carolina University

Master of Arts in English, Concentration in Technical and Professional Communication

Department: English

Requirements: 12 h Technical Communication Research, Theory, Writing, Editing, and Production
9 h literature
3 h composition/linguistics
3 h electives; 3 h thesis

Eastern Washington University

Master of Arts in English/Technical and Professional Writing

Department: English

Requirements:
- 10 quarter h language and literature
- 5 h technical writing seminar
- 3-5 h professional essay
- 10-15 h internship
- 25-32 h electives

Iowa State University

Master of Arts in English/Business and Technical Communication

Department: English

Requirements:
- 9 h business and technical communication
- 9 h linguistics and literature
- 9 h electives
- 3 h thesis or writing project

Mankato State University

Master of Arts in English with a Concentration in Writing

Department: English

Requirements:
- 20-24 quarter h technical communication and research
- 9-24 h other English courses
- 3-6 h thesis
- 1-6 h internship

New Mexico State University

Master of Arts in English with an Emphasis in Technical and Professional Writing

Department: English

Requirements:
- 12 h Technical/Professional Communication Core
- 6 h technical or professional area
- 2-3 h computer-related coursework
- 9 h rhetoric and literature

6 h thesis or internship
computer language, foreign language, or statistical analysis

University of North Texas

Master of Arts in English with a Concentration in Writing

Department: English

Requirements:
3 h Style and Technical Writing
6 h Professional Writing
3 h Rhetoric
3 h Linguistics and Composition
3 h Technical Editing
3 h Technical Writing and the Computer
3 h Research and Documentation
6 h thesis

Oklahoma State University

Master of Arts in English, Technical Writing Option

Department: English

Requirements:
3 h Introduction to Graduate Study
6 h internship
12 h English electives
6 h thesis, or 9 h additional electives
3 h management elective
6 h foreign language of equivalent

Pennsylvania State University

Master of Arts in Writing with a Concentration in Technical Writing

Department: English

Requirements:
15 h technical writing, editing, nonfiction writing, graphics, and empirical research methods
6-9 h other writing courses and rhetorical theory
6-9 h electives: internship, technical or scientific courses, literature, or graphics, journalism, film, or speech
3-6 h individual study, including final project

As all of these programs have English as their major field, most of them include some literature courses as either requirements or electives. The focus on literature and other traditional offerings of English departments varies from school to school: at East Carolina, students are required to take 9 hours of literature, while at North Texas all courses involve technical or professional writing or editing. In fact, the curricula of most of these programs are fairly flexible, including many hours of electives and options for the students to pursue their individual interests. Eastern Washington's program includes 25-32 quarter hours of electives; 9 hours of Iowa State's 30 are electives; and up to 21 hours of Oklahoma State's program can be earned in English electives. The most rigidly defined program in this group is at North Texas; the entire curriculum there is made up of required, specialized courses in technical writing and editing.

Internships are required at four schools: Bowling Green, Eastern Washington, Mankato State, and Oklahoma State. At Pennsylvania State, students can choose to do an internship or take additional electives in English or a technical field. Students at New Mexico State can choose between doing an internship or writing a thesis. At Iowa State and North Texas, students can participate in an internship program, but that does not count as hours towards graduation.

In keeping with the flexible nature of most of these programs, only two require students to pursue courses in a technical or scientific area: Bowling Green and New Mexico State. However, many offer that as one of the options for the additional elective hours that are built into the curricula. At Iowa State and Pennsylvania State, students can elect additional courses from the English department or other departments. These programs that allow the students more control over the courses they can take towards their degree rely on the advisor's discretion to help the students choose viable options.

Most programs require a thesis or final project; however, at Oklahoma State students can choose between writing a thesis or taking 9 hours of additional electives. As mentioned earlier, New Mexico State allows students to choose between writing a thesis or participating in an internship. It makes sense that these programs demand a thesis, as the students are working towards a concentration in writing or communication. Because the primary degree is in English, East Carolina requires students to take comprehensive examinations in literature as well as in writing.

3.5 Master of Science with an Emphasis in Technical Communication

Only one program in the current discussion fits into this category: Iowa State. This program leads to an M.S. in Journalism and Mass Communication with a Science Writing Emphasis; Iowa State has another program in this chapter, the M.A. in English with an emphasis in Business and Technical Communication.

Iowa State University

Master of Science in Journalism and Mass Communication, Science Writing Emphasis

Department: Journalism and Mass Communication

Requirements:
- 4 h Theories of Communication
- 4 h Research Methods or 3 h Advanced Reporting
- 3 h Strategies of Communication
- 3 h Science Writing
- 3 h Creative Component
- 3 h Professional Seminar
- 3 h journalism electives
- 9 h electives outside of journalism

This M.S. degree bears no resemblance to the M.A. degree offered by Iowa State. All the required courses here are offered by the journalism department, while the M.A. requirements are all English courses. While the M.S. program is intended for students with backgrounds in journalism or the sciences, the M.A. degree is primarily intended for students with backgrounds in English.

The "creative component" in the program is a writing project chosen by the student. Some options include a series of science stories or information materials published by a scientific organization or institution. This requirement gives students more latitude than a traditional thesis requirement.

CHAPTER IV

CURRENT DEBATES AND CONCLUSIONS

4.1 Introduction

Having acquired a clear, specific understanding in the last chapters of the various types of undergraduate and graduate programs in technical communication, we are ready to look at the biggest issues surrounding these programs today. Section 4.2 considers an area that has inspired debate since the first programs emerged: how to balance the theoretical and the practical. For program developers, this issue presents itself in such situations as whether to require a course in general rhetorical strategies or a proposal writing course, or whether to add a readings course in the analysis of technical writing or a graphics lab. Section 4.3 examines the problem of defining the differences between undergraduate and graduate programs; this issue is an especially important one now as more and more programs emerge that make no distinction between the levels of degrees in their philosophies or in their curricula. The final section considers a related, broader topic: how to establish consistency among programs at different schools. The wide disparity of programs, even with those that grant the same degrees, has been demonstrated in the previous

chapters; much attention is currently focused on how to best remedy that situation.

4.2 Balance Between the Theoretical and the Practical

The academic field of technical communication, by definition, contains elements of the practical and the theoretical. Striking a harmonious balance between these two aspects has been an area for concern and debate since the inception of technical commmunication programs. Chapter 1 summarizes articles from the 1970s representing early positions in this debate. Now let us look at more recent arguments about and facets of the tension between the theoretical and the practical.

One aspect of this issue is the debate between training students for specific jobs or teaching general principles that the student can apply later in a variety of situations. Many programs require only general technical writing and editing courses; however, Polytechnic University's B.S. program includes two courses in report writing and a course in operation and maintenance manuals. While a practitioner in one area of communication might consider the skills involved in her job to be the most important for the technical communication student to learn, the educator must look more broadly at the various positions that students might eventually attain and at the everchanging face of the

profession. As Paul Anderson noted, this is not a right or wrong situation. An education can be too specific and thus limit a student's possibilities; however, a too-general education can prepare a student for no occupation whatsoever. The balance between these two tendencies must constantly be considered and evaluated. He viewed the dialogue between professionals and educators as an opportunity for "creative tension" (Anderson TC 7).

This tension between the theoretical and the practical in academic programs in technical communication needs to be an important consideration for those who are planning or developing programs. One objection to programs that have emerged onto the scene quickly is that this major issue has not been clearly integrated into the philosophies of the program or into the curricula. The lack of a coherent philosophy underlying a program can lead to a jumbled, unrelated set of courses comprising an unsuccessful curriculum. Many academics have considered the implications of the issue, though, and have designed their curricula to resolve the dilemma. For the most part, the programs described in this study reveal a careful consideration of this issue; these programs are among the older and more established in the country.

The developers of the Master of Science program in Technical and Science Communication at Drexel University incorporated the elements of this debate into their program

philosophy and curriculum. One year after the program was in operation, Professor Stephen Brennan presented a paper to the Council for Programs in Technical and Scientific Communication outlining the program at Drexel. To provide students with the necessary practical experience, the program places students in positions as professional communicators, which both develops their skills and improves their employability. Another goal of the program, though, is for students "to understand how technical and science communication relates to human values and how it affects society and other disciplines" (Brennan 28). To this end, the curriculum includes three required seminars: "Science and Technology, Literature and the Arts"; "Ethics in Technical and Science Communication"; and "The Practice of Technical and Science Communication." The first course looks at how science and technology have "shaped the arts and changed our perceptions of ourselves and our world" (31). The second seminar includes the study of ethical theories and case studies. The third course explores the "special responsibilities, problems, and opportunities" of the professional communicator. These courses still remain an integral part of the technical and science communication program at Drexel.

The director of another technical communication program wrote an article titled "Balancing Technical Communication Programs." Michael Gilbertson, then director of the B.S.

program at New Mexico Tech, also argues for balance between the theoretical and the practical in communication courses. He asserts that lessons in grammar need to be supported by an understanding of the history of the English language. A course in the principles of discourse theory should precede and enhance work in specific types of discourse like proposals, reports, or manuals. Rather than merely learning the structure of documents that are currently in general use, Gilbertson stresses that students need to understand the reasons underlying those structures and practices; "scholarship corrects the inflexibility of rote practice (whether in industry or academia) that doesn't give students the intellectual tools to deal with a swiftly changing professional environment" (251).

Looking at how specific programs resolve this issue can provide some good ideas and directions, but each program must resolve the issue in its own way. These examples are valuable for showing how the clear articulation of a program philosophy can be manifested within the curriculum. Program directors need to be aware of the inherent tension between the practical and the theoretical in a technical communication program, and they need to develop a strategy to resolve that tension within their own programs. Moreover, this issue is never really "settled"; instead, it continues to be, throughout the life of the program, an area for evaluation and consideration.

Thus far we have considered the debate between the theoretical and the practical primarily as it relates to material taught in the classroom. Another integral aspect of this debate is the degree to which industry should actively influence the technical communication curriculum. Most programs incorporate an internship to provide some real-world experience to complement the students' classroom preparation. In addition to that collaboration between the academy and industry, many programs look to local industry to help decide the most important and necessary skills that their graduates will need when they enter their careers. Often, departments will set up an industry advisory board to encourage an exchange of ideas between the university and the people who are likely to employ the university graduates.

A presentation at the 1986 International Technical Communication Conference, "Industry and the Schools," addressed this issue directly. In her article, Joyce A. Hutton, an editor at Boeing Computer Services in Seattle, Washington, traces the history of early business training and the relationship between business schools and industry. She begins by stating her position clearly: "Education has always had an important impact on social life. And, just as important, social life has always had an important impact on education" (Hutton 292). Her argument opposes those who see the influence of industry on education as a recent,

malevolent development. She discusses how two schools in the Seattle area, Bellevue Community College and The University of Washington, work together with local industry to enhance their programs.

This same issue of the influence that industry has on university programs is treated as an ethical one in Gerald M. Parsons' "Ethical Factors Influencing Curriculum Design and Instruction in Technical Communication." He agrees with Hutton that the collaboration between industry and academia is necessary and good, but Parsons takes a more cautious stance. While he affirms the exchange between educators and practitioners in the field of technical communication for the ultimate benefit of the students, he holds that educators must carefully monitor this balance to "protect the independence of our institutions from undue corporate intrusion and influence" (Parsons 204). Parsons suggests that the way to ensure the necessary autonomy of the classroom is that any influence by corporations must be "measured against the goals and missions established by our institutions" (204).

The tension between the theoretical and the practical remains a frequent topic for discussion and debate. Articles and presentations concerning various facets of this issue are increasingly available; academics in the field have the responsibility to be aware of the arguments and to keep the issue alive in their own programs.

4.3 Undergraduate Versus Graduate Programs

With so many new programs on the market, much confusion exists among students, academics, and industry about what should be expected from an undergraduate degree as opposed to a graduate degree. As we saw in Chapters 2 and 3, many programs overlap classes from their undergraduate and graduate curricula. In addition, an undergraduate degree from one school may provide a student with the same level of skills and knowledge as a graduate degree from another school. Articles on the subject agree that this lack of a consistent philosophy among undergraduate and graduate programs results from the newness of the field; however, at this point in the development of the field it is time to address this issue and develop some conclusions.

While the issue of balancing the practical and the theoretical in technical communication programs has been raised since this academic field began, trying to define the differences between undergraduate and graduate programs is a much more recent consideration. In fact, four articles from the STC Proceedings of the 1989 International Technical Communication Conference deal directly or indirectly with this subject; before that time, not much had been written about the issue. The timeliness of this issue results from both the natural maturation of the field and the large

number of new programs that have been emerging in the last few years.

No one person or group of people can determine what, precisely, should define and differentiate undergraduate and graduate programs in technical communication. For this reason, the four articles from the 1989 ITCC that treat this subject approach it from the perspectives of different interested participants in this debate. The first, "Industry Expectations in Technical Communication Degrees," includes the results of a survey of publication managers at NCR Corporation regarding what they expect from a starting employee with a master's or a bachelor's degree in technical communication. The second article, "Educational Directions (with Questions and Reflections)," is written by a graduate of Bowling Green's undergraduate program who is now working as a technical writer; he considers a variety of issues relating to academic programs in the field. The third, "An Investigation of Graduate Courses in Technical Communication at Universities in the United States," includes the results of a survey of members of the Association of Teachers of Technical Writing asking them to rank the most and least important courses in a graduate program. The fourth article, the most comprehensive of the group, is titled "Undergraduate and Graduate Programs in Technical Communication: Defining the Differences." This article by Billie Wahlstrom, director of the Rhetoric and Technical

Communication program at Michigan Technological University, includes a good analysis of the various aspects of the argument and provides some strong suggestions regarding how to solve the problem.

Lloyd Weber, university relations coordinator for the Corporate Publications department of NCR Corporation in Dayton, Ohio, conducted a survey of the publication managers at NCR about what their expectations are for graduates from bachelor's and master's degree programs in technical communication. The survey asked respondents to rank their expectations of graduates of bachelor's and master's programs on the job, on a scale of 1 to 7, with 1 being low expectation and 7 being high expectation. The questions in the survey included the following categories: overall knowledge of technical communication; specialization within technical communication; overall job skills; technical competence or aptitude; productivity; promotability; and overall value to the organization (Weber 23).

The mean scores of the survey show that the respondents' expectations for employees with master's degrees are about one point higher in each of the categories than for employees with bachelor's degrees. Despite these higher expectations, eight of the respondents indicated that they would prefer to hire bachelor's degrees; four said they would prefer to hire master's; three expressed no preference (Weber 24). The explanatory comments of those who would

rather not hire master's degrees, despite their higher expectations for them, reveal much about these managers' perceptions of master's degree programs. Many felt that these higher degrees indicated higher levels of specialization and an orientation to research rather than basic production (Weber 24).

Weber admits that his study is limited; however, it does raise important issues. Primarily, the differences between a master's degree and a bachelor's degree are not, as we know, as clearly defined as they should be; however, at least in his organization, managers do not seem to be aware of that discrepancy. If this is more generally true, misconceptions among practitioners abound as to what to expect from their new employees. Likewise, those hiring communicators may be wrongly biased for or against applicants based on their misconceptions about the applicants' educations. Again, it is important to know what industry's perceptions and opinions are as to what the technical communication programs include; however, as we discussed earlier, these views must be tempered with the views of educators. Most importantly, educators and practitioners alike need to be better informed about the current state of education in the field of technical communication.

The second in this group of articles from the proceedings of the 1989 ITCC raises many good questions about these educational programs, although it does not attempt to

provide any answers. Rather, the author, Ben Dorsey, a graduate of Bowling Green's undergraduate program and a technical writer for Eastman Kodak Company, follows up the questions with his own "reflections." These reflections shed little light on the issues; their purpose seems more to justify his own educational decisions than to attempt to resolve the problems. However, the questions are clear and important, and his perspective does provide a balance for the opinions of educators and managers included in the other articles.

Dorsey's questions are divided into four different categories, or "scenarios," that a person might ask at corresponding stages in his or her career development. The first section, "Becoming a Technical Communicator," notes the development of the field that most certainly will require, in the next few years, a related degree to enter the field. Next, Dorsey looks at the undergraduate degree in technical communication. Here he raises two particularly apt questions: "Is the idea of developing consistency between technical communication programs incompatible with the `diversity of experience' idea that has shaped our profession?" and "Will my bachelor's degree in technical communication prepare me for the challenges of the workplace as equally as one who received a bachelor's degree in another discipline and a master's in technical communication?" (Dorsey 26).

The first question is one we will consider in the next section. The second, though, merits discussion here. A "yes" or "no" answer cannot begin to answer this question; rather, it depends completely on which programs at which schools. An undergraduate program that includes a broad range of communication courses, some theory, and science courses, can actually prepare a student better than an unrelated undergraduate degree combined with a limited graduate progam. However, as mentioned earlier, potential employees, unless they are familiar with the specific programs in question, have no way of knowing that that discrepancy exists. Therefore, no single answer exists for this question at the present time.

The two categories of questions related to graduate study also raise some important issues, such as the problem of some graduate programs in technical communication duplicating courses of undergraduate programs, making them repetitive and unproductive for those who already have a bachelor's degree in technical communication. Another issue for students to consider is how best to integrate an undergraduate major with a graduate degree. Overall, Dorsey's article would have been extremely useful had he answered the questions he raised. As it stands, it is a good overview of some of the problems and considerations in academic programs in technical communication today.

The survey conducted by Earl McDowell, professor of speech communication at the University of Minnesota, asked a random sample of members of the Association of Teachers of Technical Writing (both educators and practitioners) to rank the most important and least important courses to be included in graduate programs in technical communication. Two categories of graduate students were considered in the study: those who had a bachelor's degree in technical communication and those who had a bachelor's degree in an unrelated discipline. The list of 48 courses, divided into areas of writing and editing, oral communication, graphics, communication theory, and computers, came from the curricula of 12 schools listed in Academic Programs in Technical Communication (McDowell 28).

The information in this article relates not only to this section but also to the next section on developing consistency among programs at different schools. Of most importance for the present discussion is what both practitioners and educators consider necessary knowledge for graduate students entering the workforce. For those students with a bachelor's degree in an unrelated discipline, the highest ranked courses among both practitioners and educators included technical writing and editing, document design, and graphics. For students with a bachelor's degree in technical communication, courses ranked highest included publication management, document design, testing documents,

computer system documentation, instructional materials, and graphic design. In general, participants indicated that students with unrelated undergraduate degrees should focus on writing and editing skills; for those students who would have already mastered these skills at the undergraduate level, management and research skills were indicated as most important at the graduate level (McDowell 29).

The final article in this loosely connected series of four, by far the most comprehensive, incorporates the premises of the responses to the surveys and answers many of the questions raised in the other three discussions. First, Wahlstrom acknowledges the problems that currently exist for students, academics, and practitioners in the lack of coherent differentiation between undergraduate and graduate programs in technical communication. The demand for technical communicators continues to grow; in order for programs to serve both students and industry well, these problems need to be resolved.

Rather than merely assert that undergraduate and graduate programs need to develop more consistent philosophies, Wahlstrom proposes what should differentiate the two levels. She argues that an undergraduate program should prepare students to perform the daily work required by companies. Theory, at the undergraduate level, should be primarily implicit in the courses. At the graduate level, students should become competent in the skills necessary for

daily production but also be able to "provide critiques of current practices and to help companies prepare for and make use of new communication technologies" (Wahlstrom 31). Theory should be explicit and the central core of instruction.

Wahlstrom acknowledges the tension that exists here between the goals of industry and the goals of academia. Industry is more interested in hiring someone to do the job than someone who is going to restructure the entire procedure. However, only by carefully controlling the development of graduate programs can the academic field of technical communication continue to grow; moreover, university programs must continue to "push for people well grounded in theory and research who can understand and help ease this transition" to an information age (32).

This definition of undergraduate and graduate programs undermines the integrity of those graduate curricula that include undergraduate courses for those students whose backgrounds are unrelated to technical communication. Wahlstrom suggests that many graduate programs need to raise their entrance requirements; also, students entering these programs with varying backgrounds should be required to take extra courses to supplement their previous experience (33). A rigid core curriculum in graduate programs would ensure that students received solid training in written, visual, and oral communication. Finally, Wahlstrom argues for

"thorough examinations on their course work, research, and projects before they are allowed to graduate" (33).

No one involved with academic programs in technical communication can deny the need for a clear differentiation between undergraduate and graduate programs; this is a natural development as technical communication matures as an academic discipline. The debate between the academy and industry on this issue can only be settled by well-educated graduates from sophisticated programs proving their worth, and the worth of their programs, in the workplace.

4.4 Towards a Consistent Curriculum

The discussion of the need for a clear differentiation between undergraduate and graduate programs leads us to the related, broader issue of developing consistent curricula among the various programs throughout the country. This issue of consistency, as well as that of differentiation between degrees, is a fairly recent topic. The rapidly growing number of programs has created growing concern that the programs, even those that have the same name and grant similar degrees, represent a wide range of curricula and levels of quality.

In academic fields that have been established for a longer time, the curricula are more consistent from school to school. For example, a biology major from one university

can be expected to have a fairly similar range of knowledge as a biology major from another university. In other professional fields, professional societies monitor the curriculum and accredit those programs that meet certain guidelines. For example, the American Physical Therapy Association works as quality control in the field of physical therapy to set criteria and certify programs. Thus far in the field of technical communication, this has not happened. Societies like the Council for Programs in Technical and Scientific Communication, the Association of Teachers of Technical Writing, and the Society for Technical Communication have worked to spread information on education and facilitate communication among the community. However, none of these societies reaches all of the programs in the field. Moreover, for a group to emerge to work towards consistency in curricula, representatives from many of the programs would have to unite to empower such a committee. A more widespread understanding of the situation and its related problems will have to precede such an action.

In discussing the need for consistency among curricula, we are not assuming that an ideal situation would be one in which all programs offer the exact same courses. Ben Dorsey asked an important question: "Is the idea of developing consistency between technical communication programs incompatible with the `diversity of experience' idea that has shaped our profession?" (26). The field of technical

communication encompasses many different areas and disciplines, and no one program could prepare a student in all of them. Wahlstrom and Meese, in "Designing Graduate Programs to Prepare the Communication Leader of 2000+," assert that "Technical communication is a blend of written, oral, graphical, political, ethical, practical and theoretical issues" (12). In developing programs, departments should draw on their own strengths to choose what areas to emphasize in their curriculum.

Allowing for such variations in emphasis, however, does not negate the need for consistency in the basic structure of programs. Many articles acknowledge the need for some sort of consistency but quickly move on to other subjects that seem more manageable to avoid the controversial and difficult issue. "I admit, as does Dr. Smith, that I don't know which core subjects educators should teach. In fact, determining a core curriculum for all academic technical communication programs may be an act of futility" (Southard 157). This author asserts that the rapidly changing field would render such a prescribed curriculum obsolete before it could be implemented. Despite the inherently problematic nature of this issue, it must be confronted by academics if the field is to progress and mature.

In Chapters 2 and 3, we looked at a sample of undergraduate and graduate programs that have been in existence for at least five years; the comparison of the

curricula from these schools provides an introduction to the breadth of the problem we are considering. Even in fairly well established programs, much disparity exists among the curricula of various programs at different universities. In looking closely at each category of programs, we saw how even those leading to the same degree provide students with different skills, experience, and knowledge.

By dividing the chapters according to the type of degree granted, the programs fell naturally into different categories. This organization also points to one approach to solving the problem that can lead to greater continuity of curricula while still allowing for individual programs to develop their own areas of expertise and emphasis. Those programs leading to a B.A. in English with an Emphasis in Technical Writing are educating students in a different way than those programs leading to a B.S. in Technical Communication. Both can be valid approaches to educating technical communicators, if the programs are sound. Rather than trying to establish one "standard" program with a set curriculum leading to one type of degree, the different types of degree programs could coexist, as they do now, but with some basic criteria guiding the development of curricula within each category. This method of standardization would improve consistency while allowing for flexibility. Also, if the method were clearly articulated and widely understood, students could better choose what

type of education would best suit their needs and interests; program developers and professors could better incorporate the goals of their program into the classroom and understand the relationship between their programs and those at other institutions; and educators could better understand what to expect from their employees graduated from different programs.

This approach does not instantly solve the problem, but it does suggest one way to allow programs to remain flexible while ensuring a level of consistency among the growing number of programs in technical communication. Educators are becoming increasingly aware of this issue, which is the first step in developing a solution; as information becomes more widespread, the knowledge will call some to action and leadership in resolving the problem. Perhaps an existing society, such as the Council for Programs in Technical and Scientific Communication or the Society for Technical Communication, will assume a leadership role; or perhaps a new group of academics with this specific issue in mind will join together. In any case, we cannot expect technical communication to fit into the patterns of other academic disciplines, as it is necessarily a very comprehensive and diverse field.

"An English Major for the Information Age: Language Resources for Management" looks at recent outgrowths of English departments, including technical communication

programs. Peter Crow, English professor at Ferrum College, sees the varying types of programs as a positive manifestation of the growth and change of higher education brought on by the information age.

> Possibly the day is passing when academic programs across the nation, like industrial assembly lines, have the same names and practically identical offerings. If so, then the academy will have confirmed one of my fondest hopes for the information age--that products, operations, and even entire enterprises will be recognized more for responsive individuality than for conformity to norms or dexterity in jumping on a bandwagon. (Crow 15)

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