Communication in the workplace: What can NC State students expect?

A research report

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Preface

This report grows out of one of the most successful assignments in NC State's professional communication courses. The assignment asks students to interview someone who has a job they would like to have in five years about the writing and speaking tasks associated with that job.

Students write up the results of their interviews, including quotations from the professionals about their on-the-job communication practices. Often, students are astonished (and appalled) to discover that technical and business professionals spend on average 34% of their time at work writing, and another significant portion in oral communication in person (43%), on the phone (22%), and in meetings (26%).

Most of what students discover in these interviews confirms national survey results from the past 30 years, and from our own survey results over the past 10 years. However, the impact of first-hand information from a role model is far greater than that from a teacher or published text.

We have harnessed the power of large numbers twice before, during the spring semester of 1996 and spring semester 2001. This third survey conducted during the fall semester of 2006 provides a five year follow-up study. In all three semesters, faculty in the English Department coordinated their assignments so that the results of many interviews could be compiled and compared.

This assignment is not only a successful teaching strategy; it can also be a valuable source of information for instructors and curriculum planners as they try to keep up with the changing practices and problems of the workplace. We have found that when many students gather the same kind of information at the same time, we acquire information that has statistical power as well as anecdotal richness.

Dr. David Covington
Professional Writing Program Director

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The questionnaire, revised somewhat from the one used in 2001, was prepared by David Covington, Etta Barksdale, and Jamie Larsen.

The NC State Alumni Office provided a list of alumni who had graduated within the past five years in the same fields as those of our students, to assist students in finding someone to Interview.

The data analysis could not have been completed without the help and advice from Joy Smith, Business and Technology Application Specialist in the NC State Statistics Department. Joy conducted the factor analysis and analysis of variance, and provided invaluable advice about interpreting the survey data. Etta Barksdale, Sarah Egan-Warren, Jamie Larsen, and Stephanie Trunzo coded the qualitative data, which provides some of the most interesting information in the following report.

Special thanks is also given to Dr. Carolyn Miller for her guidance in conducting prior research in 1997 and in 2001, which provides a solid foundation for analyzing this current set of data. Dr. David Covington, Director of the Professional Writing Program, provided insight and encouragement from the initial idea of conducting this research to the publication of the final results.

Introduction

Why did we do this study?

One of the most frequent comments that employers make about college graduates is that their communication skills aren't adequate for the workplace. Faculty and administrators in most technical programs at NC State (as well as nationwide) have heard this complaint from their advisory boards and other industry contacts. But it is hard for curriculum designers and

instructors to know why these complaints are being made and what they mean. Exactly what kinds of communication tasks can graduates of NC State expect to do in the workplace? How are electronic technologies and global economies affecting these tasks? What affects the quality and results of their communication—both oral and written? And how important is this component of their overall work responsibilities— and why?

The three courses in the English Department's Professional Writing Program (ENG 331, 332, and 333, which focus, respectively, on technical, business, and scientific communication), are a primary means of curricular response to the concerns of employers. Thus, those of us in the program realize the need to gather information about communication tasks in the workplaces to which students in these courses will go.

In 1996 and in 2001 we did surveys very similar to this one, which began to answer these questions (they are available at
http://courses.ncsu.edu/eng331/common/resources/survey/index.htm
and
http://courses.ncsu.edu/eng331/common/resources/ciw2002/index.html.
These prior reports have proven very useful in our teaching and course planning. We saw from the "five year" gap between the first survey and the second that communication practices in the workplace change very quickly. Therefore, five years later we thought it would be worthwhile to conduct a new survey, to see if we could track any changes and add to the prior database that we have created. These new results, as the 2001 results also did, confirm the importance of communication skills for another generation of students.

We hope this report will be useful to the NC State community. It can help us to understand the communication tasks students will face as they enter the workplace; it can also help us to address students' responsibilities not only to engage effectively in those tasks but also to improve workplace practices.

How did we do this study?

During the fall semester 2006, faculty members and students in 44 sections of NC State's courses in technical, business, and scientific communication (ENG 331, ENG 332, and ENG 333) conducted a coordinated series of 463 interviews with working professionals that students identified as appropriate role models for their own careers. Although this was not a formally randomized survey, we aimed to ensure relevance of the information (for both students and faculty) by asking students to interview someone with a job they would like to have in about five years. To assist students in finding suitable persons to interview, we made available a list of NC State alumni who had graduated within the past five years in fields similar to their majors.

The professionals responded to a structured questionnaire and commented informally about their workplace experience. A copy of the questionnaire is included in Appendix A. The questions emphasize writing but also seek information about various forms of oral and global

communication, and the impact of technology on communication in the workplace. Students wrote reports on their interviews, providing us not only with the responses to the questionnaire but also with accounts of their discussion, which often included interesting verbatim quotations from those interviewed.

This report presents the quantitative results from the questionnaire and explores the implications of the discussions in the student reports. In Appendix B we explain the coding system used for compiling this qualitative information. We report means for the quantitative data in Appendix C. We also subjected the responses to a factor analysis and an analysis of variance to test for correlation and comparisons among items based on size of organizations and professionals' titles. These results are given in Appendix D. Finally, a list of the employers of all those interviewed is given in Appendix E

What do professionals tell us about writing and speaking on the job?

Who responded to the survey?

Questions 1-5

Although we received 463 student reports of interviews for the qualitative data analysis, our database containing the survey results from professionals numbered 297. This database is large enough for us to draw significant conclusions about differences in communication practices between professionals based on the quantitative data analysis that we conducted.

The majority of these professionals work for organizations with over 500 employees (52%), while 22% work for companies that employ fewer than 50 people, and 26% work for companies with 50–500 employees. Overall, 67 % worked for private industry, 7% for nonprofits, and 26% for local, state, or federal government. NC State and the North Carolina state government employ many of the professionals interviewed (58). Appendix E provides a complete list of the employers represented in our sample.

Forty-one percent of the interviewees graduated from NC State. The average year of graduation for the group is 1995, with a range from 1964 to 2006. This range of dates enables us to look for

differences between entry-level and experienced employees. We divided the responses into two groups, 120 who graduated within the past five years, representing entry-level employees, and 151 who graduated five years ago or more, representing experienced employees (26 did not provide this data, or were in professions other than the seven that we grouped).

In order to determine differences among professions of the respondents, we grouped the respondents into the following seven categories, based on their job titles and descriptions of workplace responsibilities:

Education	35	12%
Engineering	57	19%
Finance, Accounting, and Banking	32	11%
Management	44	15%
Marketing and Sales	34	11%
Programming	20	7%
Research	75	25%

Results for each of these groups are given in the second part of this report.

What are the differing communication patterns seen in various sizes of organizations?

Question 4

The factor analysis showed a strong correlation between writing formal documents, such as reports and proposals, with writing in collaboration with others on the job (see Appendix D for the factor analysis results). In addition, the factor analysis indicated that those who write memos also tend to write more formal business letters. Both of these factors indicate that these types of documents need to be taught in the professional writing classes.

Professionals who use a lot of email on the job also communicate more on the phone and in group meetings via teleconference. The statistical results also revealed that technology is impacting with whom professionals communicate. Those who use instant messaging also communicate more with people from other countries.

The analysis of variance (also available in Appendix D) showed no differences in the communication patterns in organizations with 50–100 employees and those with 100–500 employees, so we combined those categories to produce the following results:

In large companies (over 500 employees), professionals write fewer memos and letters than in smaller organizations. They also communicate less one-on-one by phone. However, professionals do communicate more in group meetings via teleconference in large Companies.

In the comments in the reports, respondents noted the need for "audience focus" for effective writing. Ineffective writing was linked repeatedly to loss of money and time, law suits, misunderstanding, and ultimately frustration. One researcher echoed these sentiments:

"I repeatedly see co-workers get upset and confused about things written in emails. However, almost all of the time the frustration is a result of misunderstanding."

The purposes for communication varied, and later in this report we provide specific details on the different types of communication for each profession we surveyed. Although these differences were noted, agreement was seen as the professionals commented on the need for documentation on the job. One manager said,

"If something wasn't put down on paper, it never happened."

One programmer summed up the need for writing with audience and purpose clearly stated,

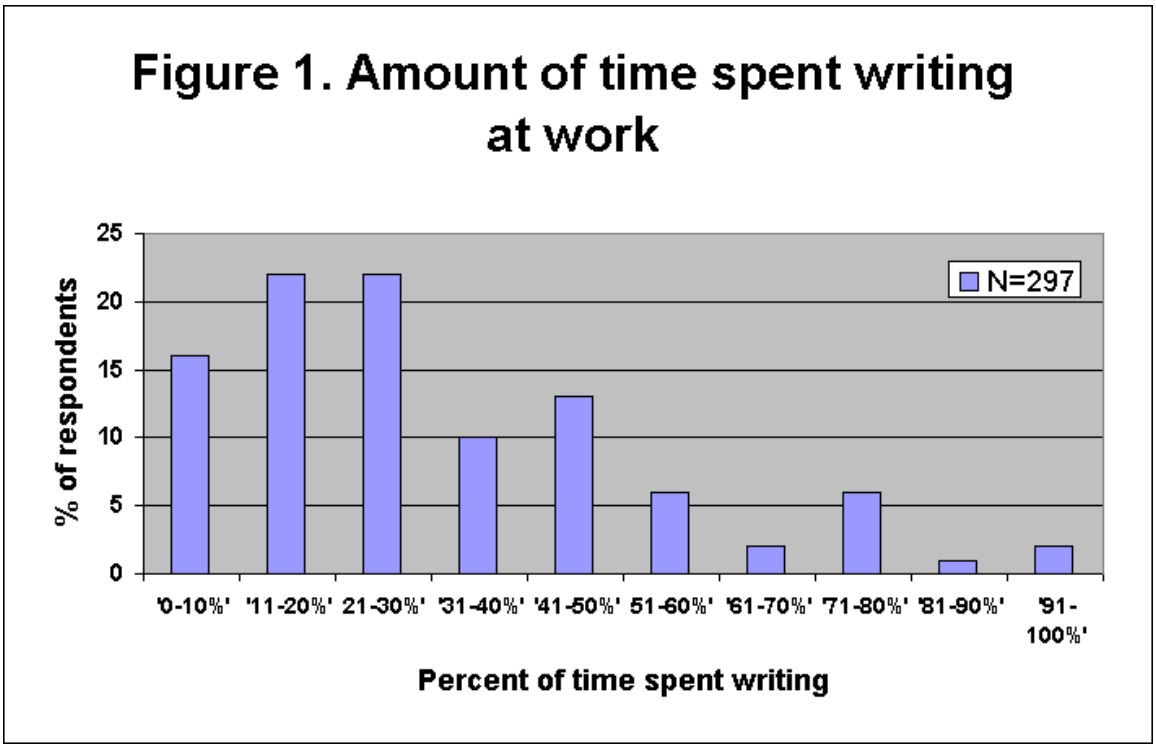
"Each document should be able to stand alone without having someone there to explain the meaning."

How do they spend their time writing at work?

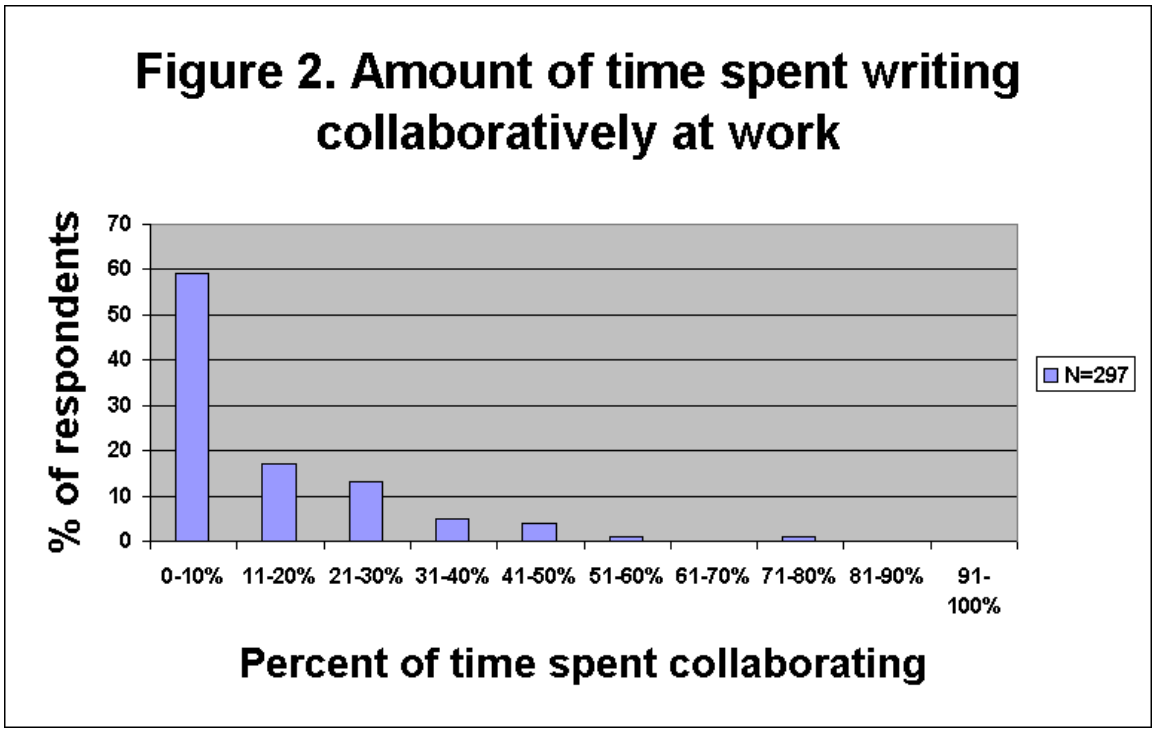
Questions 11, 12, 13

We found that professionals spend 34% of their time writing on the job. This is a slight increase from five years ago when the mean was 30%. Figure 1 shows in more detail that 54% of the respondents spend between 11% and 40% of their time writing, which is only slightly lower than five years ago. This indicates that workers still spend about a third of their work time writing, planning, reviewing, and revising documents. As one professional noted,

"If you don't document it, it didn't happen, you didn't inspect it."



The professionals as a group reported that 15% of their time on the job is spent collaborating with others to plan and write documents. This percentage is lower than the 23% from five years ago but it is the same as the percentage from 10 years ago. Figure 2 shows that a sizeable proportion (30%) spends 11-30% of their time collaborating in their Writing.



One interesting trend was that professionals now spend more of their time writing e-mail (38% of their work time) than they did five years ago (25%) and even more than ten years ago (11%), and e-mail is the most frequent form of written communication used. Other forms of hard copy documents are formal documents (20%), memos (12%), and letters (11%). Surprisingly, these numbers are the same as five years ago with the exception of letters which was 10%.

We added instant messaging and blogs to the survey and the professionals reported that they use instant messaging 4% of the time and blogs only 1%.

Many of the respondents discussed the process of their writing on the job. Peer reviews were mentioned frequently, as well the importance of adapting to the "culture" of the workplace in which the professional communicated. One marketing professional described one way to fit in and communicate within his company,

"When I first started I borrowed heavily from other, previous proposals and refitted them for my own use. I also relied on input and editing from colleagues."

An engineer also described the process of writing on the job,

"It's kind of a learn-as-you-go process, by example and by critique of what you've written."

The impact of technology on the writing process was a topic that cropped up in the interviews across all professions. The positive effects for saving time and money are encapsulated in the following quote from a finance professional,

"It [technology] has revolutionized the way we do business. It has taken communication to the next level. We can now do in 2 minutes what took us two weeks to do. It has saved money, time, and energy."

But even with the increasing use of email, instant messaging, and teleconferences within the home office and in the workplace, the need to focus on the readers' needs was consistently mentioned. One programmer said it best,

"Technology is great but one big requirement remains the same, humans need to understand."

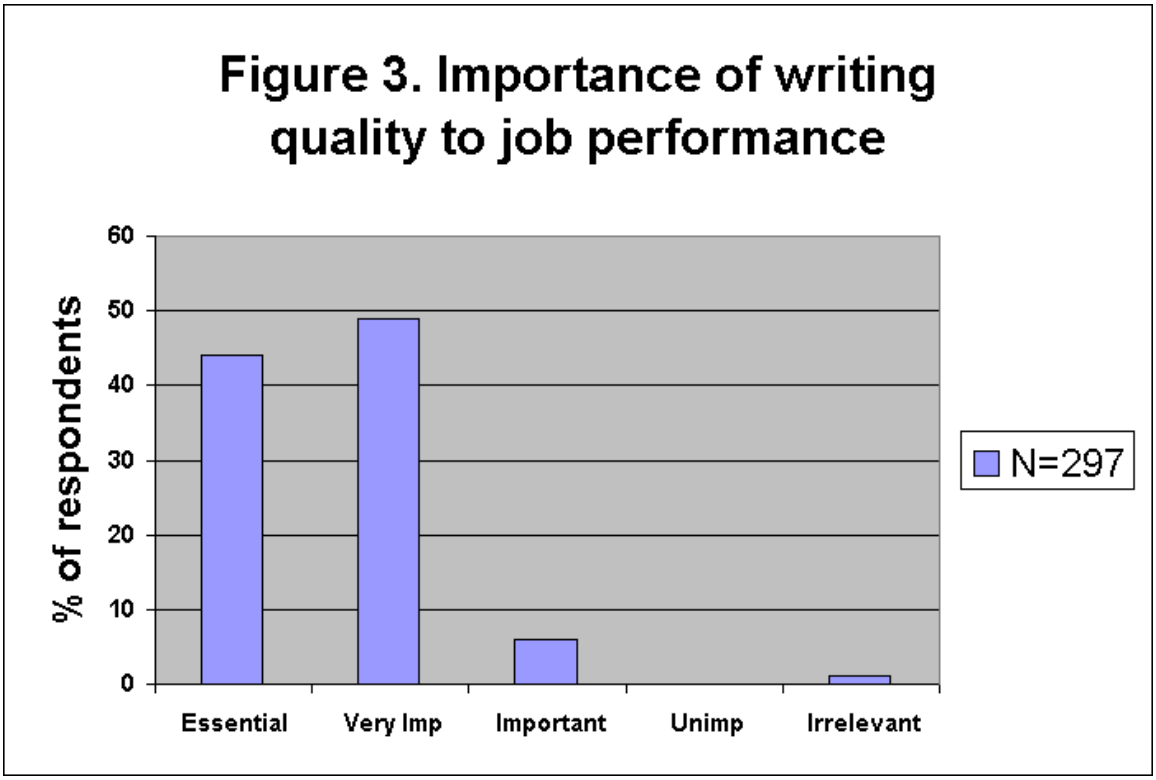
Because writing itself is so important on the job, we compiled the following statistics and figures quantifying the significant amount of time that professionals spend writing on the job:

How important is their writing?

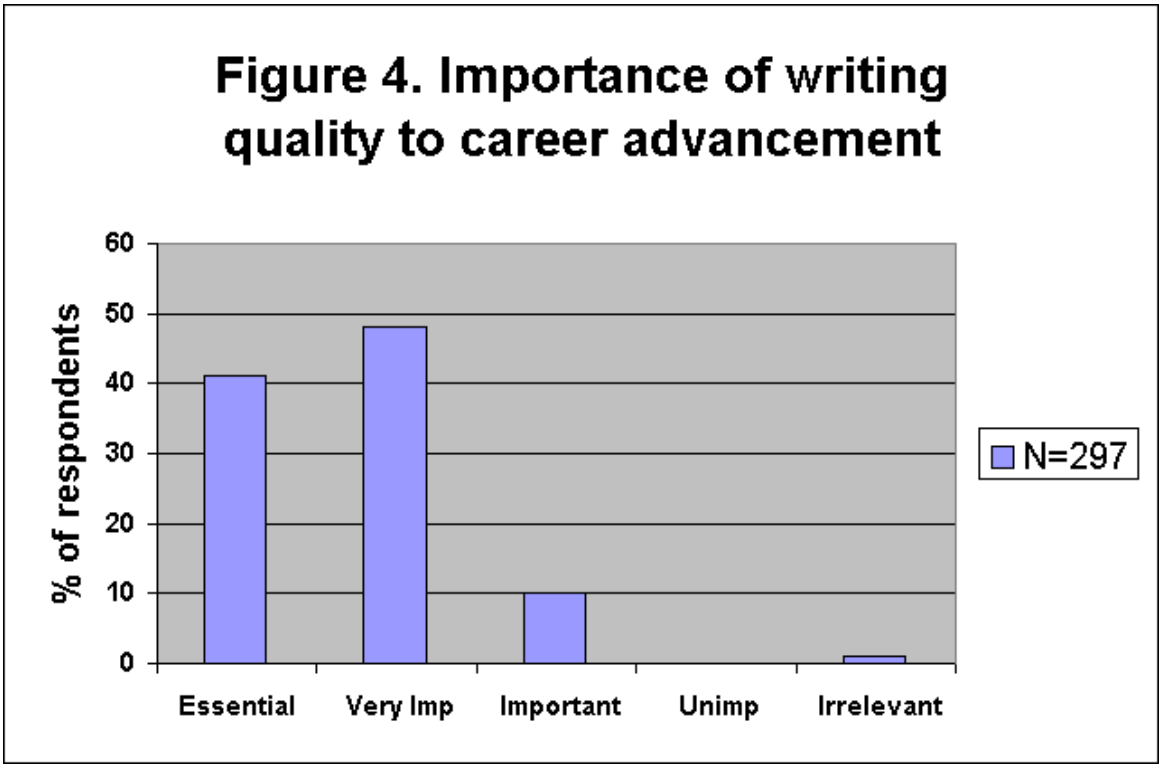
Questions 8, 9, 10

The majority of professionals interviewed (92%) indicated that oral and written communication were a part of their performance appraisals. When asked how important the quality of their writing is for the performance of their jobs, the respondents said it was either essential (44%) or very important (49%). These figures are almost identical to five years ago with 43% for essential

and 45% for very important. Less than 1% said it was irrelevant. Figure 3 - Importance of writing quality to job performance shows these percentages graphically.



A strong majority, 89%, rated the importance of their writing to their own career advancement as essential (41%) or very important (48%), and only a few (1%) said it was irrelevant. Figure 4 shows these figures, which also mirror what professionals indicated five years ago, when 84% linked quality of writing to their advancement.



Writing is equally important regardless of size of organization. In companies with over 500 employees, 50-500 employees and fewer than 50 employees, the ratings of importance of writing to job performance were very close to the mean for the entire group. In all companies regardless of size, employees rated importance of writing as essential and very important. Figure 5 shows these comparisons. Similarly, professionals rated the importance of writing to career advancement as essentially the same as for job performance regardless of size of organization, which can be seen in Figure 6.

Figure 5. Importance of writing quality to job performance by size of organization

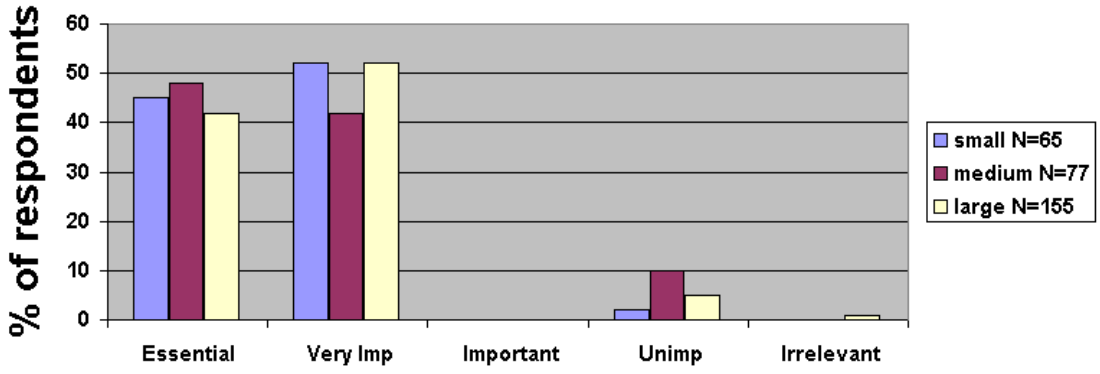
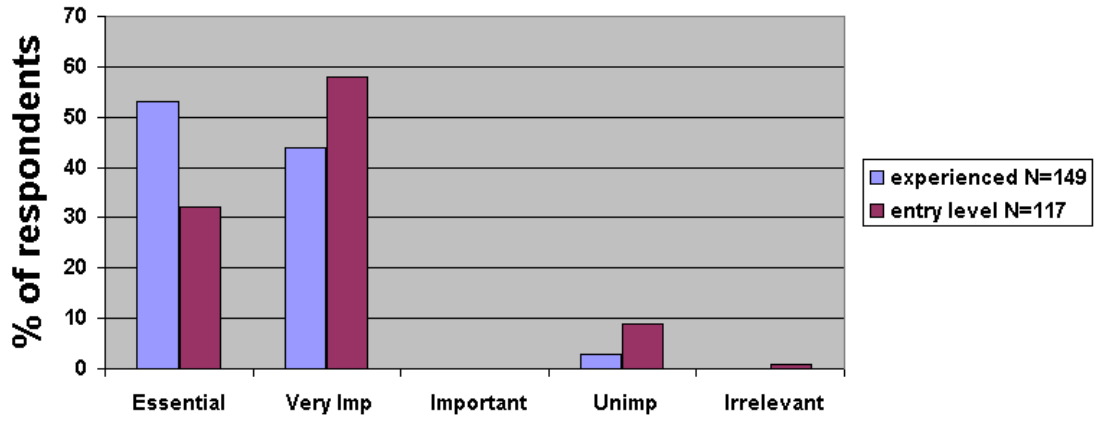


Figure 6. Importance of writing quality to job performance by experience level



When comparing the way entry-level employees and experienced employees rated the importance of writing to their job performance, we found similar findings to those from five years ago. Both experienced and entry level employees rated writing quality as essential, very important and important to their job performance.

Many professionals commented on the need for effective writing in terms of saving time and money. But one manager put the cost on a more personal basis as she said,

"Ultimately, inaccurate or ineffective writing could cost you the Job."

One programmer noted another personal motivation for effective Writing,

"It was important to be taught in school how to create good written communication but the motivation to really apply myself to good document writing was seeing end results."

To sum up what most professionals noted, the consequence of ineffective communication is ***"lots of frustration and wasted time."***

Do they communicate with people of other nations and cultures?

Question 15

Two-thirds (64%) of the professionals surveyed indicated that they spend some percentage of their time communicating on the job with people from other countries. This is basically the same as five years ago with 67% of professionals saying they communicate internationally with their peers and customers.

The analysis of variance of the survey data revealed that programmers communicate significantly more than any other profession with people from other countries. This result differs from five years ago when it was found that researchers communicated more globally.

Programmers stated that they spend 20% of their communication time in international communication; whereas the mean for all professions is 9% of total communication time.

Many professionals commented on the impact of technology on communication in the workplace and especially as it relates to global communication. One engineer expressed this change well,

"It seems like just a few years ago our biggest time delay was waiting on prototypes or documents from venders or other firms. With the new video and high speed transfer programs that have come out, we can work with someone in Japan as if they were in the next room."

One professional stated that his company was even attempting to "standardize" international communication by developing a dictionary which explains exactly what terms should be used in given contexts (e.g., the difference between login and log in). An engineer said that her diction changes according to her audience and that she must carefully choose her words when writing to international suppliers.

Because international communication is so important and increasing, we who teach professional writing need to know more about the varying language and forms required in the workplace. One professional specifically highlighted this need,

"Instead of walking down the hall and asking someone a question you might have to talk to someone in India or Scotland."

Finally, one professional said it best,

"No one should rely on only one form of communication, especially when contacting international suppliers."

What forms of oral communication do these professionals use?

Question 14

On the questionnaire, we asked the professionals to specify what percentage of their time was spent orally communicating either one-on-one or in group meetings.* One-on-one communication included 43% in person and 22% on the phone. Group meetings consumed a quarter of their work time (26%), and group teleconferences took about 9% of their work time.

Size of organization had an impact on professionals' time spent orally communicating. Employees in organization with more than 500 communicate less one-on-one by phone than in small organizations. However, employees in large companies communicate significantly more often in group meetings via teleconferences.

Marketing spends the most time communicating one-on-one by phone than any other profession. Programmers spend the least amount of time on the phone except for engineers,

researchers, and educators. Marketing also spends the most time in group meetings via teleconference except for management. Researchers and educators have significantly fewer teleconferences than marketing and Management.

The factor analysis (see Appendix D) showed a strong correlation between oral communication on the phone, group teleconferences and email. This suggests that both strong oral and written skills are used in conjunction and are important for effective communication on the job.

In the interviews, professionals seemed to emphasize their preferences for one-on-one, more personal oral communication. They found it easier to orally communicate their thoughts and even pointed to the loss of this due to the "ever expanding global economy" and need for teams and managers to communicate across countries using the more impersonal email and instant messaging. Effective documentation then takes on another important aspect as one engineer noted,

"Since people are not talking face-to-face or on the phone, the personal element of connection is lost, so the writer needs to be very careful to avoid miscommunication."

As we found five years ago, there still is a direct relationship between oral and written communication in the workplace. Many noted the need to follow up oral communication with written documents to show that the communication took place, and one engineer said that many times he sent an email after a phone conversation to reinforce his point and leave a "paper trail."

On the flip side for the need of documentation to clarify what has been spoken, good oral communication still stands out as a key skill that all professionals should acquire as noted by a researcher first, and then a manager below,

"Sometimes oral communication is more important then Written."

"The abundance of email is overwhelming and misused. It has begun the downfall of personal communication; I see too many inter-office emails that should be handled by face-to-face Communication."

* These figures add up to more than 100% since question 14 specifies that the percentage of the professionals' time spent orally communicating in the listed modes did not have to add up to a 100%.

How is technology affecting the communication patterns of professionals?

We found that professionals use a variety of communication technologies including email, instant messaging, teleconferencing, and blogs. Among these, professionals use e-mail the most. Respondents said they spend 38% of their time writing emails, 13% more time than was reported in 2002 and 27% more than 10 years ago.

As a financial professional commented,

"Probably about 4/5th of my writing each day is in the form of email. I have to constantly touch base with borrowers, lenders, AE's (account executives), and the loan officers working for
Me."

This reliance on email was echoed by a researcher,

"I communicate through email most often. I can work on a paper with a colleague via email without meeting with them."

In some organizations, the rise of emails means the decline of memos. Though the survey shows that all professions continue to use memos (the mean amount of time spent using memos for all professions was 12%), some offices are becoming almost paperless. Says an engineer,

"With the introduction of emails and the internet, paper memos have been nearly erased in the work force. Nearly 80% of paper memos have been replaced with the electronic email versions. Also with the ability to insert photos and graphs more easily, the impact of writing has improved significantly."

According to the interviews, professionals rely on email because of its speed, ability to reach many audiences simultaneously, and because it generates a "paper" trail:

"….I may not always remember what someone has told me, but I can always find an old email," remarked one manager.

Respondents, however, were also vocal about emails' disadvantages, and they listed several. For instance, many respondents noted that if writers don't draft emails with careful attention to the communication's audience and purpose, these emails could embarrass both the writers and their organizations. As one manager said,

"You cannot always tell a person's 'tone' from an email. What might sound uncouth to me might be considered polite to someone else. Additionally someone might send very informal emails around the office, but forget how to be more formal with clients. This can come across as unprofessional."

Emails with grammar errors and misspellings are another cause for consternation. One loan officer described these emails as ***"a contamination of corporate America"*** and said they portray the writer as lazy and sloppy.

Another respondent noted emails' potential for future repercussions,

"You never know when something you wrote could resurface and come back and bite you."

A few of the professionals were concerned that the ease of email and instant messaging allowed people to avoid face-to-face conversations. As a manager said,

"Things like email replace face-to-face contact. When you can't tell someone something to their face, I think it is a cop-out."

Another frequent complaint was information overload. Respondents reported being overwhelmed by the sheer volume of email, and some aid they receive as many as 200 emails a day and routinely send 20 to 50. With this quantity, it is no wonder that professionals note being frustrated by long, rambling emails with buried information. Several respondents commented that these emails are quickly "trashed."

Other communication technologies are being used on the job, too. We found that all professions use instant messaging (IM) 4% of the time for their workplace communication. Since we had not asked about instant messaging or blogs in previous surveys, we cannot tell how fast their use is growing. However, one respondent said his company had gone from "frowning" on instant messaging a few years ago to installing a company-wide IM system for intra-organization communication. An interesting finding is that programmers in large organizations (500+ employees) use instant messaging significantly more (17%) than do all other professions.

Blogs received the least reported use as a workplace communication channel. All professions reported a mean of just 1% of time spent writing blogs.

How did they learn to write at work?

Questions 6 & 7

Sixty-two percent of respondents said they had taken a college course designed to prepare them for workplace communication, and 54% said this class was required. Both of these numbers are up 5% from those reported five years ago, when 57% of respondents said they had taken a college course, and 49% said the course was mandatory.

Many comments in the student reports indicated that professionals found these college courses valuable in preparing them for workplace writing. These comments credited the college courses with teaching professionals to do the following:

- tailor documents and presentations for specific audiences,
- write concisely, and
- use formats and diction appropriate for the communication's audience and purpose.

One manager noted the importance of college training with this Statement,

"Courses in English and writing are extremely useful when writing a good contract or proposal. The perception is if you can't communicate well on paper, you won't be able to follow through well on a project commitment. Knowing your subject matter is always a good thing, but if you can't communicate it well, it won't matter to the client how much you know."

An engineer spoke of how his professional writing course gave him a head start on the writing tasks he encountered on the job,

"In our office, there really is no set structure for writing reports, so the English course I took at NCSU helped give me an idea of how things should look and be presented."

A marketing professional said this about her college training,

"I always took my English classes for granted, until I had to put my skills to work…."

While many respondents mentioned the benefits of a college writing course, others mentioned the benefits of learning on the job.

"Although I learned the basics of writing in school, the majority of the skills I needed came from on-the-job training."

One of the biggest benefits of on-the-job training, noted by several respondents, is learning the communication conventions of specific organizations. As this financial professional said,

"Every workplace has its own culture of writing, and it's up to the employee to learn how to write (within that culture)."

One interesting finding from the interviews is that some organizations are creating or investing in workshops to teach skills for specific types of communication such as international and electronic communication. Several respondents noted that their organizations offered these workshops to their employees.

Were there significant differences among professional fields?

In the sections that follow, we report significant differences in mean scores among the fields for which we had sizable subgroups: education, engineering, finance, management, marketing, programming, and research.

The results in the following sections rely on the factor analysis and analysis of variance (see Appendix D). The factor analysis produced four factors that grouped the survey variables into clusters related by writing and speaking on the job. In the analysis of variance, we found 14 variables where there were significant differences related to size of organization or job title ($p=<0.05$), from which we could draw conclusions about communication differences between professional fields. In addition, one of these variables (online chat) had a significant interaction between size of organization and job title, which showed how communication practices vary based on both the size of an organization and the professional field (see Appendix D for the table of p-values).

In these sections, we also discuss trends indicated in the discussions in the student reports, especially the audiences and types of documents and communication situations mentioned by each group.

Education (35 respondents)
Engineering (57 respondents)
Finance (32 respondents)
Management (44 respondents)
Marketing (34 respondents)
Programming (20 respondents)
Research (75 respondents)

Education (35 respondents)

This group comprises 12% of our database and consists primarily of professionals with teaching responsibilities, most of them faculty at NC State or other universities. Educators, when compared to the other six professional groups, engage in significantly less time writing emails (31% of their time as compared to marketing with 48% or engineers with 41%). Also, educators, along with researchers communicate less via teleconferences for group meetings than all of the other Professionals.

Although these percentages did not stand out as significant in difference from the other professions, it is interesting to note that educators spend 14% of their time collaborating with others when planning and writing documents. They also spend 21% of their time producing formal documents, which is more time than spent producing memos and letters. Educators were also close to the overall mean for all professionals in spending time using chat/IM/text messaging and blogs (3 % and <1% respectively).

From the qualitative data and educators' quotes, we found as we did five years ago that they still have concerns about the efficiency and usefulness of online information. Being able to understand how to "data mine" and refine an elaborate key word search were both identified as valuable skills to develop. One educator made this comment expressing this need and even frustration at the impact of such a vast array of information now available online:

"There is too much to google, too many pdfs to download, and too many files to organize, and they sneak into my Communication."

Educators were also very sensitive to the needs of their audience when communicating as expressed by this quote:

"If the material does not address the needs or concerns of the reader, then, they simply will not read it."

Education, continued

Educators' audiences and documents are related to their research and classroom responsibilities.

Audiences	**Documents**
Students	Education and grant proposals
Peers	Bi-annual progress reports
Managers	Textbooks
Editors	Recommendation letters
Funding approvers	Research papers
	Technical reports
	Overheads
	PowerPoint presentations

Engineering (57 respondents)

The engineers in our survey are 19% of the database and hold positions such as design engineer, process engineer, controls engineer, technician, race car engineer, position and margin analyst, manufacturing engineer, assistant project manager and systems Designer.

In the current survey, engineers reported spending the same amount of time writing, 32%, as they did in the previous survey. However, the time spent in writing emails increased from 24% reported in 2002 to 41% in the current survey. The balance of their writing time is divided into these types: formal documents 23%, letters 10%, memos 9%, and instant messaging 3%. The results did not indicate any workplace blog use.

Concerning international communication, engineers reported spending 9% of their time communicating with those from other nations, the same amount as the mean for all professions.

The engineers in our survey were clear about the hazards of poor communication skills. One engineer noted that a misinterpreted sentence could cause a chain reaction leading to a major disaster. Another described how a small error in translating spoken comments into writing caused incorrect equipment specifications, resulting in a $30,000 loss for the company.

These quotes from other respondents also emphasize how an engineer's writing skills affect the company's bottom line:

"Cluttered, disorganized, and unclear writing will result in a need for more talking and less action while developing a product, and could ultimately lead to a product's cancellation or an employee's firing."

"Effective writing can lead directly to (a) lower cost of products and a faster release, both of which can yield increased profits."

"…Written quotes and proposals can win or lose work from a potential customer, specifications can put everyone on the same page and mitigate scope creep or misunderstood expectations, design and release documents can aid manufacturing and maintainability, and good test procedures can help avoid massive redesigns. All of these really come down to one thing: well written project documentation saves us money in the long run."

One engineer commented on the value prospective employers place on good communication skills in job seekers,

"A company isn't going to hire someone that needs training to communicate to their coworkers when they can find someone who already has the skill."

The engineers' comments also underscored the variety of communication technologies used in their workplaces: wikis, webcasts, listservs, blackberrys, cell phones, video conferences, as well as email, CHAT, and instant messaging. One engineer reflected on the dual nature of this abundance,

"In many ways, the variety has given us a way to effectively communicate volumes of information rather quickly, but the constant flood of information has also become a source of distraction for most people."

Engineering, continued

Audiences	**Documents**
Suppliers	Test cases
Managers	Test reports

Senior executives
Clients
Corporate board members
Occupational Safety and Health Administration (OSHA)
Environmental Protection Agency (EPA)

Design proposals
Post mortem reports
Employee reviews
Software requirements specifications
Exposure assessment reports
Product requirement specifications
Adverse conditions investigations
Install instructions
Reports to management
Technical manuals
Business letters
Technical papers for publication
Request for bid (RFB)
Standard operating procedures (SOP)
Site visit reports
Contracts
Marketing material

Finance (32 respondents)

This group represents 11% of our database. The finance professionals surveyed hold a variety of positions in financial services including accountant, internal auditor, loan officer, forensic accountant, senior vice president / director of accounting and finance, and bank branch manager.

These professionals spend over a third of their workday writing (36%). Of that writing time, 36% is spent composing emails. The rest of their writing time is divided between formal documents (16%), memos (13%), instant messaging (6%), and blogs (1%). As for letter writing, finance

professionals report spending only 8% of their time in that activity. Though the difference is not statistically significant, it is interesting to note that this is the lowest of all the professions, less than the mean of 11%.

The survey results from five years ago indicated that finance professionals spent more time communicating one-one by phone (42%) than the other professions. This time, however, finance
professionals reported communicating one-on-one by phone just 28% of the time.

In their comments and quotes, finance professionals emphasized the importance of writing to their jobs. One told of a well-written letter that persuaded the IRS to abate a $5,000 penalty. A CPA noted that the clarity of her writing was just as important as her analytical recommendations, especially since her audience might not be as knowledgeable about accounting as she is. Another finance professional said this,

"I really do not know how to rate the importance of writing to my job performance. It is critical that I am able to write a memo, business letter, and be able to follow instructions. Because if we are ineffective, the results may mean someone has to pay higher taxes, may not get a business loan that they depend on."

This quote from a respondent emphasizes the value of communication in finance,

"To succeed in any job, you must have excellent communication skills that convey accurate information to the Audience."

Finance professionals had much to say, too, about the impact of technology on their organizations and work habits. Most lauded the speed and efficiency that technologies like email, blackberrys, cell phones, and web cams have brought to workplace communication.

"Without all the technological advances that have been made, I would be lost at work…E-mail, fax, internet , intranet, etc. have all provided instant communications with clients and Colleagues."

However, others noted the problems these technologies bring, such as carelessly written emails filled with slang, poor grammar, and misspellings. One respondent even called it "a contamination of corporate America."

Oral communication was another important subject for those in finance. Said a finance professional about oral communication,

"[…] someone with good communication skills can go far. It is not only important to do work, but it is also important to be able to effectively communicate with others…."

Another finance professional specifically pointed to the frequent need for oral communication on the job,

"Oral communication is important and occurs throughout the typical day in the form of telephone calls, discussing issues in meetings, explaining issues to peers and/or clients, and general 'shop talk' about the industry of emerging issues affecting the profession."

Finance, continued

Audiences	**Documents**
Clients	Audit memos and opinions
Internal Revenue Service	Memos
Subordinates	Letters to clients, vendors, and regulatory agencies
Managers	Financial analysis reports
Senior-level executives	Auditor's report letters
Financial institutions	Policies
Accountants	Testing procedures, objectives, results, and conclusions

Coworkers	Loan comments and commitment letters
	Interview and case reports
	Employee evaluations

Management (44 respondents)

Managers comprised 15% of our sample and came from a variety of backgrounds and organizations such as healthcare, sales, software development, human resources, pharmaceuticals, publishing, and accounting. Their primary responsibilities center on directing people and projects.

In this survey, managers reported spending more time writing on the job (40%) than they did five years ago (33%). Their writing time is split between these types of documents:

- email 36%,
- memos 17%
- formal documents 16%
- letters 8 %
- instant messaging 2%
- blogs 1%

Although the differences did not stand out as statistically significant, managers spend more time communicating orally than the mean amount of time for all professions, as the table below shows.

Managers' Percentage of Oral Communication Compared to Mean for All Professions

Oral Communication Type	Managers' Percentage of TIme	Mean of All Professions
One-on-one in person	46%	43%
One-on-one by phone	30%	22%
Group meetings in person	28%	26%
Teleconferences	11%	9%

Good communication skills, written and oral, are critical to being a successful manager, according to the comments from those professionals in our survey. One manager said that colleagues will infer a person's competence from his or her writing skills. Another manager attributed his advancement, in part, to the care he takes drafting documents. Two others related stories about poorly written resumes that landed in the trash instead of on the hiring manager's desk. These comments were summed up by this quote from one manager in a large accounting firm,

"It is next to impossible to become a manager if you are not an effective communicator."

Another manager expressed the situation from the company's point of view,

"….The last thing any company wants is an employee communicating in and out of the company who cannot convey a professional and competent image."

Managers also emphasized the importance of effective oral communication, from PowerPoint presentations for senior management to conversations with colleagues. One manager said,

"My boss can be a little scary at times, so I need to have all of my information straight before we speak….especially if I have to deliver news that she doesn't want to hear…."

Another commented on the value of "looking people in the eye and speaking clearly," saying that a confident demeanor can be very persuasive.

Another issue the managers discussed was how email and other communication technologies have transformed their working lives, not always for the better. While managers appreciate the efficiency technology brings to communication, they're frustrated by poorly drafted emails that have a tone too casual for the workplace, saying, ***"This can come across as unprofessional."***

Management, continued

Audiences

Clients
Senior executives
Lenders
Account executives
Other managers
Subordinates
Builders
Governmental agencies

Documents

Contracts
Quarterly analysis reports
Valuation reports
Job descriptions
E-mails
Audit finding reports
Proposals (internal and external)
Market analyses
Grant reports
Employee evaluations
Financial requests to county government
Risk management reports
Status reports

Agendas
Work plans
Product assessments
Justifications of promotion
Test plans
Process documents
Procedural notes
Newsletters
Departmental policies
Contact trip reports
Portfolio reviews
Investment recommendations
Explanation of purchase orders

Marketing (34 respondents)

The marketing and sales professionals in our survey composed 11% of our database and had job titles such as senior account representative, pharmaceutical sales specialist, marketing data analyst, marketing manager, proposal manager, business development manager, and marketing coordinator.

Of all the professions, marketers spend on average the most time writing on the job. Marketers reported spending 42% of their time writing as compared to the mean of 34% for all professions. In addition, marketers spend more time writing email (48%) than do all professions, except for engineers and programmers. The rest of marketing and sales professionals' writing time is divided this way:

- Formal documents 17%
- Letters 14%
- Memos 12%
- Instant messaging 2%
- Blogs Less than 1%

As far as oral communication, marketers spend significantly more time in one-on-one communication by phone (38%) than any of the other professions. In addition, marketers spend 46% of their time in one-on-one in-person meetings, 27% of their time in group meetings in person, and 17% in teleconferences.

A small percentage of their time is spent in communicating with people from other countries, just 6%.

Throughout their comments, these marketing and sales professionals stressed the importance of writing skills, saying they were central and "key" to success in the field. As one respondent put it,

"Effective writing is a key to performance; it can ensure customer satisfaction as well as knowledge for the client."

A sales consultant emphasized the value of communication with this Comment,

"Being able to clearly communicate your thoughts and ideas to someone else is key to advancing in the business world."

These professionals recounted stories of coworkers who were ***"chastised"*** by management for poorly written reports and of job hunters whose resumes were tossed because of errors and ineffective formatting. A sales manager even described losing an account due to a carelessly drafted letter. Another marketing professional echoed the idea that in marketing and sales, poor writing carries a high cost,

"Ineffective writing results in you and your organization looking unprofessional, which could cost you a customer."

One marketing director summed it all up with this comment,

"If you do not have good communication skills you will not advance in this industry."

Oral communication skills were emphasized, too, as evidenced by this quote,

"In my job I'm expected to know how to write and to have presentation skills."

Like the other professions, marketing professionals appreciate the speed and efficiency that email, instant messaging, and other communication technologies bring, but they also warn of the drawbacks. Said one respondent,

"Because people don't know your tone of voice when sending an email, you have to be careful!"

Marketing, continued

Audiences

Managers
Clients
Prospects
General public
Senior executives

Documents

Proposals
Letters of interest
Qualifications packages
Technical reports
Action plans
Monthly newsletters
Research reports
Brochures
Press releases
Flyers
PowerPoint slides for presentations

Programming (20 respondents)

These professionals are primarily those who write computer software and document its use for both internal and external audiences. They represent 7% of our database and hold positions such as software engineer, senior game designer, software developer, programmer analyst, and systems developer.

According to the survey, programmers spend 32% of their time writing Most of that time is spent writing electronically through emails (40%) and instant messaging (13%). In fact, programmers in organizations of more than 500 employees chat online significantly more than all other professions (17%).

Programmers, however, do write documents other than emails and instant messages. Our results indicate that programmers spend 14% of their time writing formal documents, 9% writing letters, 6% writing memos, and less than 1% writing workplace blogs.

In terms of oral communication, programmers spend significantly less time communicating one-on-one by phone (13%) than all the other professions, except researchers (14%). In response to the other questions about oral communication, programmers reported spending 10% of their time in teleconferences, 15% in in-person group meetings, and 33% in one-on-one meetings in person.

One of the most interesting findings is that programmers have significantly more communication with people in other countries, 20%, than any other profession. To give a comparison, the mean for this category is just 9% across all professions.

These professionals made several comments about the intricacies of international communication. One respondent talked about problems using email with persons from other countries, recounting an instance when the wrong order was given by someone abroad to an engineer in the U.S via email, resulting in problems with a program's design.

Another programmer discussed how his company uses graphics to communicate with international colleagues, finding that graphics bridge the language gap between native and non-native English Speakers.

Programmers talked about the importance of good communication skills in other contexts, too. One programmer mentioned that his company had a documentation department to help programmers with certain documents. He said the department would help adapt the document to specific audiences, and one programmer said his documentation had to ***"use language understandable by the lowest common denominator."***

Another programmer commented,

“Each document should be able to stand alone without having someone there to explain the meaning.”

The programmers in our survey use a variety of technologies as well as emails and instant messaging to communicate with colleagues. These professionals reported using wikis, internal forums, listsevs, video/phone/web conferencing, and RSS (Real Simple Syndication) feeds. Said one programmer,

"Technology has had the greatest positive effect on scheduling in my workplace; it greatly increases people's response time and easily allows you to know where and when everything is."

Programming, continued

Audiences	**Documents**
Other programmers	Test plans and cases
Managers	Design proposals
CEO	Grant proposals
Marketing	Threat modeling documents
Clients	Standard operating procedures
Users	Installation instructions and other user documentation
	Wikis
	Status reports
	Progress reports
	Process documents
	Program specifications
	Product change requests and design change requests
	Release notes

Research (75 respondents)

The research professionals in our sample work in private, public, and academic laboratories, where their primary responsibilities involve research. Researchers represent 25% of our database.

Of all the groups, researchers spend less time writing on the job except for programmers (29% as compared to the overall mean of 34%). They do spend most of their time writing memos and formal documents. Researchers, along with educators, spend the least amount of time in group meetings via teleconference.

One interesting change from our findings from five years ago is that researchers do not communicate the most with people from other countries. The results indicate that they, along with marketing, spend the least amount of time communicating globally.

Although these percentages did not stand out as significant in difference from the other professions, it is interesting to note that researchers said that they spend more of their time writing emails and formal documents than all of the other modes of writing that we listed. They also indicated that they spend 0% of their time writing blogs.

Researchers were very forthcoming about the importance of the need for good, "clean writing" skills on the job. They stated that the one thing that slows publication more than anything else is the need for multiple revisions. As they pointed to the fact that effective writing builds credibility and results in the professionals being taken more seriously, one researcher commented,

"Poorly written documents represent poor work ethic and that will play into what readers think of your research. It will give them ideas as to whether they actually believe the results and conclusions of your research."

Audience consideration was a primary theme in many of the researchers' comments and one echoed the prior sentiment,

"Writing that is not well thought out or hostile can alienate potential supporters."

Since funding and publishing research are such important aspects of these professionals' communication, one researcher illustrated how good communication skills can be even more important than good science as it impacts what eventually gets funded and published:

"Those who write well tend to be more successful in grants. Grant proposals tell a story and a well told story backed up with good science will beat out an ill-told story with better science."

Research, continued

The following audiences and documents reflect the emphasis on communication with other researchers:

Audiences	**Documents**
Peers	Public flyers
Managers/Advisors	Technical bulletins and reports
Funding Agencies	Grant proposals
Regulatory Agencies	Newsletter articles
Clients	Lab operational reports and notebooks
Media	White papers on internal research
	Conference presentations
	Research articles
	Press releases

What do professionals say about college instruction in writing and speaking?

The interviews with professionals yielded valuable ideas about what to cover in professional communication courses. For example, several respondents noted that their organizations send employees to workshops on specialized kinds of communication such as electronic and international communication. This indicates an interest in these types of skills. The need for training in electronic communication was also underscored by many comments like these two about the impact of email:

"Emails circulate to upper and lower levels of the organization management . . . and e-mails to some people are the only indicator of your job knowledge."

"The ease of communication through email can result in a lack of discipline by those who compose them."

Even with the growing interest in electronic and international communication, professionals voiced concerns about reinforcing the basics, such as writing concise, audience-oriented documents. As one manager noted,

"In college they tell you that your paper has to be at least this long. At work, it's the exact opposite. You're always trying to see if you can cut it down more so you don't end up losing your reader."

Other topics mentioned as important were document types and formatting, resumes, visual aids and oral communication. Concerning oral communication, one respondent said this,

"For NC State, an innovative focus on oral communication is a MUST for graduates' success in the current workplace."

What did the student interviewers learn from the assignment?

In reading the student reports, we also gained some insight into how students reacted to the interview assignment. One called the assignment a "shock" because it showed how much writing has to be done in the workplace. In this final set of quotations we give the students the last words. We think these demonstrate the valuable lessons they learned.

"I assumed as long as you completed your work in a timely manner that was all that was required. I was very wrong in that assumption. The manager expects much more. He or she expects the employee to possess excellent written and oral communication skills."

"The rewards of mastering communication in a given discipline are both status and financial in nature. The penalties are unemployment and missed opportunities."

"This interview was an eye opening experience for me. Even though I have worked in the professional arena for many years, I did not really know the expectations that an employer has from the employee."

"I can see why good communication (skills) whether... written or oral are important and how it can affect the lives of many people."

"I was also surprised to learn how important writing was in the workplace and the consequences of not following proper form, which can include write-ups, suspension, termination, or in the most severe case, closing of a business."

"It is imperative that college graduates know how to effectively communicate. It affects their job performance, career advancement opportunities, perception of self by others, and overall company success."

"This interview was quite helpful in showing me just how important written and oral communication is within the workplace...The most interesting things that I found were the use of instant messaging between co-workers and the increased use of e-mail. This shows me that through the use of technology, written communication is becoming more important than oral communication."

What are the most important things we learn from this study?

Like the studies we did in 1996 and 2001, the data we report here from 2006 overwhelmingly affirm the central importance of communication in the workplace. Both the quantitative results of the questionnaire and the qualitative information from the student reports show that communication, both written and oral, is an integral part of the work of technical, business, and scientific professionals in fields that NC State students represent.

The importance of communication, both written and oral, is shown both in the amount of time it consumes on the job and in the central role it plays in getting work done. Its importance is also demonstrated by the fact that 92% of our respondents indicated that communication is part of their job performance appraisals.

Our study also provides us with a snapshot of the great diversity of communication tasks and patterns that pervade the workplace. These tasks and patterns constantly evolve, adapting to innovations in technology and changes in socio-economic conditions. Professionals in each major area of our survey can expect somewhat different challenges, but all of them must be prepared to be flexible and to continue learning.

Communication is not a separate task, tacked on to professional work; rather, it is part and parcel of that work. Collaboration, problem-solving, evaluation, managing change—all take place in and through Communication.

The education we provide to students must help them prepare to be productive professionals, able and willing to contribute to the technical, intellectual, and social challenges of the workplace. But at the same time, a university curriculum should not be dictated by economic or corporate interests. It is our challenge as educators to prepare students to evaluate and improve existing practices, not merely to adapt to the world as they find it.

List of Appendices

Appendix A Survey questionnaire

Professional Communication in the Workplace Questionnaire

Professional Data

1. What is your job title?

2. What is your field?
_ Education
_ Engineering
_ Finance, Accounting, Banking
_ Management
_ Marketing/Sales
_ Programming
_ Research
_ Other

3. What is your company name?

4. How large is your company?
_ 50 or fewer
_ 50-100
_ 100-500
_ over 500

Educational Background

5. What degrees do you have?

Degree	Institution	Year
B.A.		
B.S.		
M.A.		
M.S.		
M.B.A.		
J.D.		
Ph.D./Ed.D./M.D.		

6. Did you take a college course in technical, business, or scientific writing that was designed to prepare you for writing on the job?
_ Yes
_ No

7. If yes, was the course required?
_ Yes
_ No

Writing and Speaking on the Job

8. Are oral and written communication a part of your performance appraisal?
_ Yes
_ No

9. How important is the quality of your writing for the performance of your job?
_ Essential
_ Very important
_ Not very important
_ Unimportant
_ Irrelevant

10. How important is the quality of your writing to your career advancement?
_ Essential
_ Very important
_ Not very important

_ Unimportant
_ Irrelevant

11. What percentage of your work week do you spend writing (planning, drafting, revising)?
_ %

12. What percentage of your time is spent working with others to plan and write documents?
_ %

13. What percentage of your writing time is spent composing the following (this does NOT have to add up to 100%):

Email	%
Chat/IM/Text Message	%
Blogs	%
Short, internal word-processed documents (e.g., memos)	%
Short, external word-processed documents (e.g., letters)	%
Long, word-processed documents (e.g., reports and proposals)	%

14. What percentage of your time is spent orally communicating in the following ways (this does NOT have to add up to 100%):

One-on-One		**Group Meetings**	
In Person	%	In Person	%
Phone	%	Teleconference	%

Global Communication

15. What percentage of your time communicating on the job is with people from other countries?
_ %

Interview Questions

1. What types of documents do you write? Please use the names you usually call them and describe their contents, length, format, how often you produce them, for whom, and their importance.

2. Why do people read what you write? What decisions or actions does your writing affect?

3. How did you learn to do the writing you have to do in your work - on the job, workplace training, college course, etc.? Of these, what were the most useful aspects of the training you have received in writing?

4. In what ways has technology changed the way you communicate at work, especially over the past five years?

5. Please describe any examples of the consequences of effective or ineffective writing within your organization.

Appendix B Qualitative analysis

Each of the student reports was read and coded for issues that had been identified in our 2001 research. As we read for this additional information, we also extracted and cross-referenced quotations from both the respondents and the students.

Socialization

- on-the-job training and mentoring
- sources of information for writing
- expectations versus reality
- consequences of effective and ineffective writing

Rhetorical situation

- audiences, internal and external
- purposes of writing
- types of documents

Pedagogy

- recommendations for instruction

Process

- drafts, number generated
- collaboration practices
- review and editing practices

Technology

- impact of word processing software

impact of advances in hardware, including use of e-mail
impact of internet

International

impacts of international audiences, internal and external
issues that surface in companies with international audiences

Oral communication

impacts and issues of oral communication on the job

Appendix C Descriptive statistics

Below are the mean responses to all questions for the whole group and for the major subgroups. Responses to questions 2 and 3 on the survey form in Appendix A were used to create the subgroups (field) and the list of organizations in Appendix E (company name).

	ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
TOTALS	297	35	57	32	44	34	20	75

Question 4; Size of Organization

	ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
< 50 employees	22%	20%	7%	31%	27%	32%	30%	20%
50-100	8%	6%	10%	6%	7%	15%	10%	5%
100-500	18%	23%	16%	16%	27%	12%	15%	19%
> 500 employees	52%	51%	67%	47%	39%	41%	55%	56%

Questions 5-7: Educational Background

	ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
Graduation Year	1995	1990	1196	1996	1995	1995	1997	1996
NC State Graduate (Yes)	41%	20%	47%	31%	32%	50%	35%	43%
Writing Course Taken (Yes)	62%	34%	74%	56%	48%	59%	65%	63%
Course Required (Yes)	54%	23%	65%	53%	43%	50%	60%	55%

Question 8: Communication Part of Performance Appraisal

	ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
Yes	92%	97%	88%	91%	93%	91%	85%	93%

Question 9: Importance of Writing Quality to job performance

	ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES

Essential	44%	49%	47%	59%	41%	44%	45%	36%
Very Important	49%	51%	46%	38%	50%	44%	45%	59%
Not Very Important	6%	0%	7%	3%	9%	12%	10%	4%
Unimportant	0%	0%	0%	0%	0%	0%	0%	0%
Irrelevant	< 1%	0%	0%	0%	0%	0%	0%	1%

Question 10: Importance of Writing Quality to Career Advancement

	ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
Essential	41%	46%	39%	50%	32%	44%	40%	37%
Very Important	48%	49%	49%	38%	54%	41%	50%	51%
Not Very Important	10%	5%	12%	9%	14%	9%	10%	11%
Unimportant	0%	0%	0%	0%	0%	0%	0%	0%
Irrelevant	1%	0%	0%	3%	0%	6%	0%	1%

Question 11: Percentage of Time Spent Writing (Planning, Drafting, Revising)

ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
34%	37%	32%	36%	40%	42%	32%	29%

Question 12: Percentage of Time Spent Planning and Writing Collaboratively

ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
15%	14%	14%	13%	20%	16%	11%	14%

Question 13: Percentage of Time Spent Writing in the Following Modes:

	ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
Email	38%	31%	41%	36%	36%	48%	40%	36%
Chat/IM/Text Message	4%	3%	3%	6%	2%	2%	13%	2%
Blogs	1%	< 1%	0%	1%	1%	< 1%	< 1%	0%
Memos	12%	12%	9%	13%	17%	12%	6%	14%
Letters	11%	13%	10%	8%	16%	14%	9%	10%
Formal documents	20%	21%	23%	16%	16%	17%	14%	29%

Question 14: Percentage of Time Spent Orally Communicating in the Following Ways:

	ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
One-on-one in person	43%	42%	29%	37%	46%	46%	33%	52%
One-on-one by phone	22%	15%	20%	28%	30%	38%	13%	14%
Group Meetings in person	26%	37%	23%	30%	28%	27%	15%	21%
Teleconferences	9%	3%	9%	10%	11%	17%	10%	5%

Question 15: Percentage of Time Spent Communicating with People from Other Countries

ALL	EDU	ENG	FIN	MGR	MKT	PGM	RES
9%	8%	9%	10%	10%	6%	20%	6%

Appendix D Statistical analysis

Factor analysis

Five survey questions involve similar variable related to professionals' communication behavior (see Appendix A, questions 11, 12, 13, 14, and 15). These performance-based questions lend themselves to a factor analysis to construct summary scores for correlated activities. The rotated factor pattern revealed the following four factors with high loadings:

Factor 1	Time spent writing on the job	.80
	Writing in collaboration with others	.77
	Writing long, formal documents (e.g., reports, proposals)	.58
Factor 2	Oral communication on the phone	.75
	Group meetings via teleconference	.68
	Email	.58
Factor 3	Memos	.76
	Letters	.74
Factor 4	Chat online	.80
	International communication	.77

These factors show that technology has impacted how professionals communicate on the job. Factor 2 shows that those who communicate using the phone one-on-one also tend to use teleconferences and emails more frequently. More importantly, those who use chat also communicate more internationally. Factor 1 shows that formal, long documents are created on the job in collaboration with others. Short, hard copy documents, such as memos and letters, are related activities as shown by Factor 3. This suggests that as we teach professional communication to students, we need to emphasize collaborative work for longer documents, and we need to also focus on effective oral communication and email. Chat should be highlighted as we teach global communication techniques.

Analysis of Variance

P-values for variables showing significant difference between professionals based on job title, size of organization, or both (bold p-values are significant at <0.05).

Dependent Variable	Job Title	Size of Organization	Size and Job Title
WRREQ	0.0227	0.5832	0.3020
WRCOL	0.3943	0.2051	0.3907
EMAIL	0.0513	0.6518	0.3892
CHAT	0.0177	0.0086	0.0145
BLOG	0.1228	0.852	0.7624
MEMOS	0.0574	0.0259	0.8907
LETTER	0.0942	<.0001	0.0846
FORMAL	0.3467	0.7624	0.0747
OPER	0.1717	0.1017	0.0654
GPER	0.0782	0.8196	0.1624
OPHO	<.0001	0.0467	0.3253
GTELE	0.0024	0.0169	0.1586
INT	0.0274	0.0443	0.3098

The analysis of variance (ANOVA) shows significant differences between variables that had no interactions with job title or size of organization. Only CHAT had an interaction so that variable had to be analyzed separately.

ANOVA by Size of Organization

Size of organizations are listed in order from either highest to lowest or lowest to highest mean for each variable (LSMEANS), and the CODE column indicates that those items with the same letter are not significantly different.

Time Spent Writing Memos (MEMOS)

Size of Organization	LSMEAN	CODE
50 or fewer	15.86	A
51-500	14.56	A
More than 500	9.63	B

Conclusion - Employees in organizations with more than 500 write fewer memos than in smaller organizations.

Time Spent Writing Letters (LETTER)

Size of Organization	LSMEAN	CODE
50 or fewer	15.85	A
51-500	12.23	A
More than 500	8.60	B

Conclusion - Employees in organizations with more than 500 write fewer letters than in smaller organizations.

Oral Communication one-on-one by phone (OPHO)

Size of Organization	LSMEAN	CODE
50 or fewer	25.80	A
51-500	25.62	A
More than 500	18.92	B

Conclusion - Employees in organizations with more than 500 communicate less orally one-on-one by phone than in smaller organizations.

Oral Communication in group meetings via teleconference (GTELE)

Size of Organization	LSMEAN	CODE
50 or fewer	6.25	A
51-500	6.29	A
More than 500	10.73	B

Conclusion - Employees in organizations with more than 500 communicate more orally in group meetings via teleconferences than in smaller organizations.

Communication with people from other countries (INT)

Size of Organization	LSMEAN	CODE
50 or fewer	6.08	A
51-500	9.27	A
More than 500	9.36	A

Conclusion - Employees in organizations with fewer than 50 employees communicate less with people from other countries than employees in larger organizations; however the difference is not significant (i.e., the individual pvalues are not <0.05).

ANOVA by Title

Titles are listed in order from highest to lowest mean for each variable (LSMEANS), and the CODE column indicates that those items with the same letter are not significantly different.

Time spent writing on the job (WRREQ)

Title	LSMEAN	CODE
Marketing	41.77	A
Management	40.02	A
Educators	37.00	AB
Finance	36.00	AB
Engineering	31.81	B
Programming	31.65	BC
Research	28.55	C

Conclusion - Researchers spend the least time writing on the job except for programmers. Marketing spends the most time writing on the job than engineers, programmers and researchers.

Time spent writing email (EMAIL)

Title	LSMEAN	CODE
Marketing	48.29	A
Engineering	41.32	AB
Programming	40.40	AB
Researchers	36.03	BC
Management	35.70	BC
Finance	35.63	BC
Educators	30.86	C

Conclusion - Educators spend less time communicating via email than marketing and engineers. Marketing has more email except for engineers and programmers.

Time spent writing memos (MEMOS)

Title	LSMEAN	CODE
Management	16.57	A
Researchers	13.84	AB
Finance	12.75	AB
Marketing	12.44	AB
Educators	12.31	AB
Engineering	8.72	BC
Programming	5.90	BC

Conclusion - Programmers spend less time writing memos than managers. Managers and researchers spend more time writing memos than engineers and programmers.

Oral Communication one-on-one by phone (OPHO)

Title	LSMEAN	CODE
Marketing	38.65	A
Management	29.93	B
Finance	27.75	B
Engineering	20.40	BC
Educators	14.94	BC
Researchers	14.71	BC
Programming	13.70	C

Conclusion - Marketing spends the most time communicating one-on-one by phone. Programmers spend less time communicating one-on-one by phone except for researchers, educators and engineers.

Oral Communication in group meetings via teleconference (GTELE)

Title	LSMEAN	CODE
Marketing	16.97	AB
Management	10.70	AB
Finance	9.78	BC
Programming	9.65	BC
Engineering	9.31	BC
Researchers	4.71	BC
Educators	3.28	BC

Conclusion - Marketing has the most oral communication in group meetings via teleconference except for management. Researchers and educators have fewer group teleconferences than marketing and management.

Communication with people from other countries (INT)

Title	LSMEAN	CODE
Programming	19.75	A
Finance	9.69	B
Management	9.59	B
Engineering	8.82	B
Educators	7.91	B
Researchers	6.05	B
Marketing	5.85	B

Conclusion - Programmers have the most communication with people from other countries than any other profession.

Analysis of Variable with Interaction

CHAT was the only variable to have an interaction by size of organization and title, so the LSMEANS had to be considered for each combination of size and title.

	< 50	51-500	> 500
Programming	7.50	3.33	17.73
Educators	3.71	6.50	0.06
Management	2.08	0.73	4.18
Marketing	1.36	2.78	2.71
Researchers	1.07	1.11	2.09
Finance	1.00	2.57	10.93
Engineering	-0.00	4.67	3.37

Conclusion - Programmers have significantly more CHAT in organizations of more than 500 than all other professions.

Appendix E Employers of survey respondents

The following list contains the names of the 452 companies whose employers agreed to be interviewed for this report. A number is shown if more than one employee was interviewed.

ABB Power T&D Company	2	LabCorp	
Abbot Laboratories		Las Margaritas	
Accenture	4	Latham Walters Engineer	
Adidas		Layers	
After Hours Animal Hospital		Leggett & Platt/ Inc.	
Air-Flow Technologies Inc		LIPS, Inc.	
Alan Vester Automotive		Lochmere Golf Course	
Alcatel	4	Lockheed Martin	2
Alcoa		Logan Accounting	
Alexander Central High School		Lord Corporation	
Alexandria, Virginia		Louis Tropicals	
Allegiance		Lucent Technologies	
Alltel Pavilion		LVL7 Systems	
American Express	3	Mabry Insurance	
American Homestar Corporation		Maconite Corp.	
American Kennel Club		Magellan Labs	
American Power Company	2	Magnequench Inc.	
Analytical Instrumentation		Majestic Marble & Glass	
Arris Interactive		Malcolm Pirnie Inc.	
Arthur Anderson		Mallinckrodt Inc.	3
Astrazeneca		Martin Marietta	

AT&T	4	Mayview Convalescent Center	
Autumn Corporation		McGladrey & Pullen, LLC	
Aventis Crop Science	2	McHugh Software International., Inc.	
Averitt Express		MCI Worldcom	
Bally Design		McKim & Creed	
Bank Branch & Trust Company		Med University of South Carolina	
Bank of America Corporation	3	Meddrey, Forest & Etringer	
BASF		Merck & Comp., Inc.	
Battelle		Mercury Data Systems	
Battleground Restaurant Inc.		Merrill Lynch	3
Bayer Corporation	2	MHI Brownstone Hotel	
BB&T		Microsoft	2
BEA Systems		Miller & Long Concrete	
Beanie & Cecil, Inc.		Milliken & Company	
Bear Sterns		Modus Media International	
Becton Dickinson		Moen	
Bell & Howell, Corporation		Montgomery Public School	
BellSouth Telecommunication	3	Moore & Van Allen	
Bentwood Nursery		Morgan Stanley Dean Witter	
Best Buy		Motorola Automotive & Industrial Electronics Group	
Beta Systems, Inc.		Mr. Dundarbak's	
Beverly Grant Inc.		MSC International	
Big Ape Gym		NASA	2
BioID		Nash-Rocky Mount School	
BKB		National Gypsum Company	
Blue Circle Cement		National Life	
BMW of North America		National Weather Service	2
Boiling Springs YMCA		Natural Resource Conserv	
Booth_s Associates, Inc.		Naval Aviation Depot	
Border Concepts, Inc.		Naval Research Labs	
Bowater Newsprint	2	NC CDTF	

Bozell Worldwide		NC Department of Administration	
Brigeston Forestor		NC Department of Agriculture	2
British Oxygen Company		NC Department of Transportation	4
Brookfield Zoo		NC Geological Survey	
BTI		NC Museum of Science	
Buehler Motor, Inc.		NC News Network	
Building Blocks, Inc.		NC Rural Center	
Burroughs & Chapin		NC SBI	
Burroughs Wellcome		NC SRT, Inc.	
Calendar Central		NC State University	88
Camille Patterson		NC Technology Development Authority	
Campbell Alliance		NC Utilities Commission	
Campus Crusade for Christ		Nelson/ScribnerAssoc.Inc	
Captive Fashions		NetIQ	
Cardinal Club		NetOctave Services	
Cargill, Inc.		Network OSS	
Carolina Golf Club		Nevalan Technologies	
Carolina Hurricanes		New Pert ARP Church	
Carolina Med Center		Nextel Communications	
Carolina Mills	2	NIEHS	8
Catalytica Pharmaceuticals		Norozymes	
Catawba Mem Hospital		Nortel	17
Caterpillar, Inc.	3	North State Steel	
Cato Industries	2	Novartis Animal Health	
Central Carolina Bank		New York State Department of Environmental Conservation	
Central Marketing. Inc.		Oakridge Outfitters	
Centura Bank	2	OAO Services	
Certain Teed		Oblio Telecom	
Charlotte Meck		Obrien Atkins Pro Architecture	
Cherry, Bekaert & Holland	2	P&A Administrative Services	2
Cicada Consulting Group		Paradigm	

Cirent Semiconductors		PCOMPANY	
Cisco	3	Penske Racing	
Citigate		Perry Automotive	
City of Hamilton, EE Department		PF Chang's China Bistro	
City of Kinston		Philips Semiconductors	
City of Lexington		Pitt County Memorial Hospital	
Clarient		Pletus Technology Group	
Clarkston		Powell & Partners Advertis	
Cogent Neuroscience		Poyner & Sprull	
Colonial LLC		PPG Industries	
Computer Digital Solution		Pratt & Whitney	
Cone Mills	2	Precision Fabrics	
Consolidated Diesel Company		Prestonwood Country Club	
Corning		Price Waterhouse Coopers	
Cornwallis Road Animal Hospital		Proctor & Gamble	2
Cotton Inc.	2	Progress Energy (CP&L)	
Coventor, Inc.		Providence Baptist Church	
CP&L	2	PSNC Energy	
CRB Engineers Inc.	3	Purdue Farms	
Credit Suisse First Boston		PYA Monarch	
Criser & Troutman Consultants		Quality Homes Superstore	
Crowder Construction Company		Queensboro Steel	
Culp, Inc.		Quest Engineers & Consult	
Cystic Fibrosis Foundation		Quickill Pest Services	
Cytec Industries		R.J. Reynolds	2
Dairy Records Mgt Service		Radiant Systems	
Dalton Engineering & Associates		Raleigh Medical Group	
Dan Deter/Inc.		Raleigh Neurosurgucal Clinic	
David Knight		Rasmussen Research	
DCS Corporation		Raymond James Financial Services	
Delsar, Inc.		R-C Agriculture Consulting & Research	
Delta Air Lines		Red Hat, Inc.	

Denstev International		Red Lobster	
Department of Environmental Natural Resource		Redback Networks Inc.	
Devsoft		Research Triangle Institute	
Dixon Odom, Inc.	2	Rexnord	
Doctor Vision Center		RF Hardware Design	
Dow AgroSciences		Rhone Ponleno	
Dow Chemical Company		Richland Creek Community Church	
Dr. Ann Bogard, MD		Riley Produce	
DSM Catalytica	2	Risk Management Associates	
Duke Flour Daniel		River City Cafe	
Duke Management Company		Riverbanks Zoo	
Duke Power	4	Riverside Bank	
Duke University	3	Rockwell Automation	
Duracell		Royter Industries, Inc.	
Earth Technology		SA Boney & Associates	
East Carolina Farm Credit		Sagemark Consulting	
Eastern Research Group		SAIC	
Eastman Kodak		Salem Castle, Inc.	
ECI Telecom		Sam_s Factory Outlet	
Eckerds		Samsung Chemicals	
Edgecombe Metals		Sapiens Americas	
Elan Pharmaceuticals		Sara Lee Underwear	
Embassy Suites		SAS	6
EnergyUnited		SBS Technologies	
Eng Controls Internatl/ Inc.		Science Application International	
ENG Solutions		Senternet Inc.	
Engage.com		Sentrisystems	
Engineers USA		Shop 2012	
Environmental Investigation		Shurtape Tech Inc.	
EPA	6	Siebel Systems	2
Ericsson	3	Sieck Floral Products	

Estee Lauder		Silver Creek Entertainment	
Ettain Inc.		Sir Walter Chevrolet	
Evergreen Funds		Smith Consulting	
Falls Village Veterinary Hospital		SoftSolutions, Inc.	
Family Dollar Stores, Inc.		SOS	
Ferguson Enterprises		Southern Test & Research Lab	
First Union Natl Bank	5	Spectrum Labs	
Fish Analytical Services		Sprint PCS	2
Food Lion		Square D Company	
Footprint on the Sun Theat		SRA International	
Fox Eye Care Group		St. Paul Insurance Company	
Frank Harmon Associates		Starnes & Killian PLLC	
Freeborders.com		State Employees Credit Union	5
Fujitsu		Stone Ferris Designs	
Gate Concrete Products		Stony Point Animal Hospital	
Gayle H. Smith CPA		Street Legal Performance	
General Data Systems Inc		Suitt Construction	
General Dynamics	2	Sun Microsystems	
General Electric	5	Synetron Technologies	
General Motors		Syngenta	2
Georgia Pacific		T.P. Technologies	
Gerrit Gast		Targetbase	
Gibraltor Labs		Texas Instruments	
GKN Automotive	2	The Flying Saucer	
Glaxo Smith Kline	15	The Guthrie Group	
Glen Raven/ Inc.		The Hotel Roanoke	
Glenoit Mills		The Johne Meadows Company	
Governors Club		The Limited	
Grady,Whitley & Company		The Little Gym of Raleigh	
Greater Raleigh Convention & Visitor Bureau	3	The Maxim Group	
Gregory Poole Equipment		The Navigators	
Hayes-Barton Pharmacy		The Reusche Group	

Hazen & Sawyer, Inc.		Thomas Parker General Contractors	
HealthSouth Sport Medicine		Time Warner Cable	
Healthy Back Store		Titan Atlantic Construction	
Helps Internat. Ministries		Tompkins Associates	
Hendrick Motorsports		Town & Country Veterinary Hospital	
Hill Spinning Mill		Town of Cary	
Honeywell	2	TR Lawing Realty Inc.	
Hospitality Group Management		Triangle Brick Company	
Howard Perry & Walston		Triangle Economic Research	
IBM	33	Tumbling Colors	
iEntertainment Network		Tyco Electronics	
Ind Agents Computer Service		Tyco Healthcare	
Independent Finance Planners		UCAR Emulsion System	
Indicium Design		Ultimus, Inc.	
Industrial Air, Inc.		UNC-Chapel Hill	6
Infinite Technology		UPS	2
Ingersoll-Rand		US Air Force	2
Inspire Pharmaceuticals		US Army	
International Foundation for Electrical Systems		US Department of Interior	
Intelligent Information Systems		US Fish & Wildlife Service	
Interior Wood Specialists		US Navy	6
International Paper	3	US Nursing	
Intersil Corporation		US Patent & Trademark Office	
Invensys Powerware	2	Utah Museum of Natural History	
Jacobs Supply Tech		VCA Triangle Tower Animal	
Jamesco Inc.		Vector Marketing Corporation	
JC Penney		Venture Management	
JD Beam, Inc.		Verizon Inc.	
JD Construction LLC		VideoTelCom	
Jet Stream Communication		Vitafoam USA Inc.	
Jim Merritt Consulting	2	Wachovia Investments	2

John Deere	4	Wake County Pubic School	
Kalbacker & Associates		Wallace Sports Management	
Kao Special Americas, LLC		Warren County Economic Development	
Kayye Consulting		Waste Industries, Inc.	
KCH Services, Inc.		Waterworks Supply Company	
Kelly Springfield Tire Company		Weck Closure Systems	
Kight_s Medical Corporation		Wellman	
Kildaire Animal Medical Center		Weyerhaeser	2
Kimberly-Clark		Willamette Industries	
Kimley-Horn & Associates	3	WilMed Healthcare	
King Farms of St. Paul		Windwise Inc.	
Kinston Neuse Corporation		Winston Salem State University	
Klaussner Furniture Industries		Wireless Multimedia Solution	
K-Mart		WORLDCOM	4
KPMG Consulting		YMCA	
Kraft Foods		York International	
Kuempel Service, Inc.		Zagaroli Classics	