Teaching Communication Skills Online for Technical Leadership:
A Preliminary Survey of MEPP Student Motivation

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Abstract

"Communicating Technical Information" (CTI) is one course in the Master of Engineering in Professional Practice (MEPP) offered online through the College of Engineering, UW-Madison. The participants in MEPP are mostly early and mid-career engineers seeking a technical alternative to an MBA. CTI fosters technical leadership by maintaining the best qualities of the living interactive classroom while also exploiting technologies for online course delivery through WebCT and Placeware. Besides an appropriate choice of technology and content, course design must consider the motivation of the targeted student population. Students in MEPP were surveyed to gauge the importance of technical leadership in this population’s concepts of professional growth. Responses indicate a differentiation between business management and technical leadership, an ambition to learn and apply techniques of technical leadership as part of job effectiveness, and an appreciation of the importance of communication in effective technical leadership. Future work should define “technical leadership” in detail and evaluate the motivations of engineers to develop appropriate skills. Finally, this is an age of information, technical innovation, and intense competition; business and industry should be surveyed to evaluate their resolve and motivation to foster “technical leadership” as part of the engineering culture.

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I. Designing an Online Course in Technical Communication

In a previous ASEE conference paper, the author reported on the design of “Communicating Technical Information” (CTI) as part of the online Masters of Engineering in Professional Practice (MEPP) delivered by the department of Engineering Professional Development at the University of Wisconsin – Madison (Ross, 2002).

That paper described the development of CTI and the emergence of “technical leadership” as a theme. Methods, research, and exterior motivations were discussed and the appropriateness of the theme for a graduate course in technical communication for practicing engineers was justified. The paper concluded with the following agenda for continuous evaluation and of the course and for defining the theme of “technical leadership with more precision:

*Future work should define the nature of technical leadership in detail and evaluate the interests and motivations of engineers to develop skills in technical leadership; the relationships between traditional management and technical leadership must be examined; the interests of engineers and of business and industry in career development for “technical leaders” must be assessed. Additionally, the continuing task of improving online education for technical professionals will continue to be a challenging area of development.*

The development of “Communicating Technical Information” has three stages.

Stage 1 – a largely completed task: the infrastructure of the online setting had to be understood and the best methods for conducting an online course in technical communication had to be identified. This was the main task of the earlier ASEE paper on CTI/MEPP, “In the Online Classroom” (Ross, 2002).

Stage 2 – the subject of the current report: the proposed concept and themes of the course should be tested against the personal commitment and motivations of the students or participants. The target students for MEPP and CTI are adult students well into their careers as practicing engineers. These students know themselves and their goals; what they are not interested in will waste time in a class, but what seems useful should lead to a strong commitment and to a successful class. The preliminary effort to assess the commitment of CTI/MEPP students to the theme of “technical leadership” is the subject of this report.

Stage 3 – a future task: the relationship between the goals and ambitions of CTI/MEPP
students should be measured against the actual needs of business and industry and the 
attitudes of managers who may not have a technical point of view. MEPP is a program 
which promises to contribute to the professional development of its participants. 
Therefore, identifying the wrong themes or inappropriate themes could be seen as a waste 
of time and resources. This third step in evaluation and development of CTI will be the 
material for a future report.

The survey that is summarized in this paper is a first step in the “stage two” effort to 
assess the motivation of CTI/MEPP students and their commitment to a theme of 
“technical leadership.” Their commitment and understanding of this theme will affect the 
quality of their work and the perceived value and relevance of the course to their 
professional development. The survey was informal and is interpreted qualitatively; the 
insights presented by students were summarized and evaluated for their relevance to the 
design and delivery of “Communicating Technical Information.” The results seem 
encouraging: the design and infrastructure of CTI (Stage 1 development) seem well 
matched to the aims and motivations of the students in developing their skills in “technical 
leadership.”

II. “Stage 1” Overview: Infrastructure and Design of CTI

A. MEPP Overview
As of May, 2002, the Masters of Engineering in Professional Practice (MEPP) has 
gr graduated two classes of about 30 each. The third class (graduating in May 2003) began 
the summer of 2001 and the fourth class, the Class of 2004, started the summer of 2002. 
MEPP is designed for completion over the internet in two years. It is intended for 
working engineers sited at their individual geographical locations and provides 
considerable flexibility in daily and weekly schedules. An overview of MEPP is provided 
in Appendix A. Another recent view of MEPP is provided by Don Schramm in his 
overview of MEPP and “International Engineering Strategies and Operations” (Schramm, 
2002).

B. “Communicating Technical Information” (CTI)
The author was part of the MEPP team which designed and delivered “Communicating 
Technical Information” (EPD 617). The course has undergone a steady evolution and, for 
2003, is being extensively revised.

C. Exterior Motivation: What Research Suggests about Communication Skills in the 
Engineering Curriculum

A few years ago (1994), the Office of the Dean of Engineering at the University of 
Wisconsin - Madison reported on a questionnaire sent to alumni asking about their 
experiences, professional careers, and education. A key question on the survey asked 
alumni to identify the most important subjects they had studied in their undergraduate 
engineering programs. Another question asked what they thought they needed more of in 
their education. In short, these questions asked alumni to reflect on their own education

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as it affected their professional careers. More than 9,000 alumni responded to this survey (Perspective, 1994).

In the list of subjects “which have been most useful in your career,” the top two vote getters were “Written communication” and “Oral Communication.” The next three were “Basic Engineering Science,” “Core Math Courses,” and “Design Courses.”

The top five choices for “which subjects you wished you’d had more exposure to” were, in order, “Management Skills,” “Oral Communication Skills,” “Finance/Economics,” Total Quality Management Principles,” and “Interpersonal Skills.”

The Dean commented:

*We were very interested to see that so many of you had chosen communication-oriented courses as contributing to your career. This is a message we will share with our current engineering students as we continue marketing them to our Technical Communication Certificate Program.*

The Technical Communication Certificate Program at UW-Madison is outlined in Appendix B. It is a unique opportunity for engineering students to develop their communication skills as part of their technical education in an engineering department – Engineering Professional Development (EPD) – and in the Engineering College.

The results of the UW Alumni survey in 1994 can be compared with more recent surveys of engineering graduates. Sageev and Romanowski (2001), for example, conclude in their “lessons learned” about the value of technical communication skills in the workplace:

*Technical abilities are a given: communication and leadership differentiate.*

There is an essential role for education in technical communication which can provide both skills and enduring attitudes for career-long success in technical leadership (Pappas and Hendricks, 2000).

Wheeler and McDonald (2000) observed:

*Four years is an insufficient time for students to achieve a high level of proficiency in all these areas. Rather, undergraduate engineering education should form the basis for a lifetime of learning.*

And, a little later:

*Writing can help achieve these goals in unique ways, and we argue that most courses should incorporate writing in some fashion.*

“Writing” may be too limited a word; “communication” better covers the range of skills which can serve engineers well to avoid obsolescence and to maintain a technical competitive edge.
D. The Virtues of the “Classroom” for Engaged Participants

The virtues of the real “classroom” encourage engagement and participation by all students.

1. Classroom goal: Avoid the sense of “isolation” which could result from students working more or less on their own.

2. Classroom goal: Facilitate practical communication related to the class.

3. Classroom goal: Engage participants by making them “shareholders.”

Karl Smith gave the example of Sisyphus in one of his lectures on creating engagement in the classroom. In the Greek myth, Sisyphus pushes a boulder up a hill every day, and it always rolls back down. According to Smith, this is the situation many teachers put themselves into. They push the rock up the hill for their students, the students watch, and the rock rolls back down the hill (Smith, 1990).

According to Smith – the students should be pushing the rock up the hill!

E. Engagement Theory as a basis for MEPP Course Design

The work of course design for MEPP has benefited from the direct assistance of Greg Kearsley as a course consultant. In “Engagement Theory: A framework for technology-based teaching and learning,” (1999), Kearsley and Shneiderman summarize the basis for engagement as “Relate-Create-Donate.” This simple formula captures the essence of the effective on-line course and explains the fundamental principles of CTI.

1. **Relate** – “Emphasizes team efforts that involve communication, planning, management and social skills.”

2. **Create** – “Students have to define the project (project domain) and focus their efforts on application of ideas to a specific context.”

3. **Donate** – “Stresses the value of making a useful contribution while learning. Ideally, each project has an outside ‘customer’…. ”

III. Environment and Tools for Delivering CTI

The environment and tools affect the “culture” of a class and the practical activities that can be incorporated. Four major factors determine the nature of “Communicating Technical Information.”

A. Synchronous and asynchronous environments.

**WebCT**

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WebCT is a well-known course environment for online course management. Its familiar features include internal email, discussion forum management, calendar and scheduling functions, and gradebook maintenance. “Docushare” has recently been incorporated into WebCT to facilitate homework submissions and the return of feedback or corrected papers by instructors.

**Placeware**

Placeware is the browser-based meeting manager which facilitates live on-line class meetings. Participants need a computer connection to the internet plus a phone line for audio link. Meetings are scheduled almost every week during the semester at two times, usually morning and evening on different days, to accommodate the real-life schedules of the participants. Another benefit of the “two-meeting” schedule, of course, is that splitting the synchronous meetings into two groups usually limits the number of participants to between 12 and 18, a more reasonable number than 30, for “engaged” participation by students during the hour-long online class.

**B. Tools and their evolving applications.**

**Word and Acrobat**

Basic and advanced word processing (MS Word) skills and the electronic management of documents for the purposes of collaborative work, team review, and peer editing are essential. Acrobat is not well understood by students in all cases at the beginning of CTI; most students come to appreciate the utility of this program in collaborative work, in editing and markup, and for electronic document handling.

**PowerPoint**

This almost universal “presentation” tool acquires a new personality in Placeware sessions. Instead of just a “presentation tool,” PowerPoint can be an effective “seminar” tool, organizing, stimulating, and summarizing technical ideas and well-organized complex thoughts while inviting discussion, questions, and contributions from the other participants.

**IV. The Work of “Communicating Technical Information”**

One innovation of CTI – which in fact grows out of a standard “traditional” classroom feature – is in the delivery of an oral presentation based on the semester’s research project before a live and (usually) authentic audience. This fits the “donate” component of “Engagement Theory.” Students must to try to arrange the presentation of their written project before their peers, interested persons on the job, and even management. This component of the CTI course is very demanding: many students are hesitant to bring their MEPP projects so directly into their workplace; some find it difficult to find the right “opportunity”; however, the majority do this presentation on the job – have it videotaped, and send the videotape to the CTI instructor for evaluation. For many participants, this is a memorable and challenging event which marks a significance point in their career progress toward becoming a “technical leader.”

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A. CTI Course Methods
A class structure is maintained through weekly Placeware sessions and WebCT forums on CTI topics; readings are in the textbook (currently Kristin R. Woolever, *Writing for the Technical Professions*, 2nd Ed., Longmans) and the extensive CTI Study Guide by Kutzbach and Ross.

The weekly Placeware netmeetings are seminar discussions including student and instructor presentations, and occasional guest lecturers. Additionally, WebCT facilitates communication through email (for individual issues) and forums (for public discussions). Grading is based on the satisfactory completion of all assignments plus participation.

B. Minor Assignments During the Semester
Students conduct a Placeware session (usually 15 minutes); they participate in peer reviews and collaborative projects related to their major project; they may summarize a meeting, moderate a forum, and complete a choice of other minor assignments.

C. Major Project for the Semester
CTI is the opportunity for participants to conduct research using the resources of Wendt Library plus other resources and to complete a major research project, ideally job-related.

Besides a written report, students are required to deliver an oral technical presentation, videotape it, and submit it as part of their work for the course. In the past, many excellent presentations have been made on-the-job as brown bags, technical reports to peers and co-workers, or recommendations to peers and management.

D. Transition to IRRAE
CTI is offered in the Spring of the second semester of the MEPP course sequence. In the following summer, MEPP students complete Independent Reading and Research in Applied Engineering (IRRAE) – primarily a writing and reporting project stressing the use of advanced research methodologies using the resources of Wendt Library, web resources, and other company, government, or standards resources, to solve a job-related problem. Sometimes the IRR projects grow out of the CTI project or out of other MEPP courses. For IRR, students are required to submit a paper and to make an oral technical presentation at the second MEPP Summer Residency held in Madison on the UW campus during August (Refer to Appendix A for the MEPP course overview).

V. “Technical Leadership” in Stage 1 Course Planning

A. Interests and Ambitions of Engineers on the Job
Forum discussions and other independent discussions with MEPP students reveal
ambivalent attitudes and some frustration about “technical leadership.”

“Managers” are sometime dismissed as “TIPS” – “Technologically-uniformed Important People.” However, most working engineers are quite aware of the challenges of avoiding technical obsolescence in their own careers and are working hard to prevent that.

Many MEPP participants have expressed frustrations to the authors about their opportunities and abilities to make a difference:

“The old and established people don’t want to hear about new ideas.”
“Suggesting new ways is seen as a criticism of the status quo.”
“My ideas are not respected.”

However, there are very positive attitudes at the end of the course:

“My manager wants me to make my presentation to the ‘higher-ups’.”
“I never knew how to do a proposal – now I have a new opportunity.”
“I showed that the new way will benefit the company and the customer.”
“My boss talked to me for an hour about my ideas.”

B. “Bad News on the doorstep”
Besides the professional and personal ambitions felt but imperfectly expressed or realized by many engineers, the news of the day has provided ample evidence that there are significant failures in management sometimes due to a lack of “technical leadership.” The Challenger disaster was one such case, blurring ethics, technical competence, communication effectiveness, and the issues of power and decision making. A brief bibliography is provided as Appendix C as a starting place for discussing the opportunities for improved technical leadership to meet such problems as new product design and marketing, financial fiascos like Enron and the internet bubble, and the challenges of career development for lifelong learning.

C. Significance for the engineer’s culture
Wheeler and McDonald (2000) write:

Engineers are now largely absent at the top levels of government and industry. If this is to change, we will have to educate a new breed of engineer – one that is comfortable and effective in the executive suite as well as at the construction site or at the computer. Marshall M. Lih, former director of the National Science Foundation’s Division of Engineering Education and Centers, states: “We do not educate enough of our students with the broad perspectives and long-term aspirations to be decision makers, strategic thinkers, opinion shapers, and planners....”

In “stage one” of CTI course design, the theme of technical leadership” was derived from “external sources” – published research, surveys, opinions, and discussion with students. “Stage two” looks at “internal sources” – the attitudes, judgments, and motivations of the CTI/MEPP students themselves.
VI. Stage 2: Student/Participant Survey

A. A recent survey to assess interest in Technical Leadership.
The survey form is presented as an attachment in Appendix D.

Twenty-nine MEPP students in the 2002 summer residency were surveyed. These students were just beginning their MEPP program.

The basic purpose of the survey was to assess the interest and motivation of MEPP/CTI students in the theme of “Technical leadership”:

**Question:** Does “Technical Leadership” Matter to You and Your Future?

**The written instructions were simple:**

*Please comment on the following questions; you do not have to say something on every one – just on the ones you think are most useful.*

Note that this survey was the final activity in the summer 2002 on-campus orientation for MEPP students who were just beginning the MEPP program; they will be graduating as the “Class of 2004.” The morning had been spent in an introduction to the Communicating Technical Information (CTI) course which they would complete in Spring, 2003 (Review the MEPP course outline presented in Appendix A). Discussion of CTI included the use of tools such as Adobe Acrobat markup tools for handling documents electronically; an overview of the CTI course, major and minor assignments, and course logistics through WebCT, teleconferences, and the use of Docushare; and a rationale of the coursework relating to on-the-job engineering responsibilities and the tasks of technical leadership.

In addition, the CTI instructor (Ross) prefaced the survey with a brief discussion: it was emphasized that the survey represented a serious effort at learning what mattered to these students. Frank and honest answers were encouraged; where a student had no opinion, it was made clear that no response was required. Overall, emphasis was placed on the goal of at least informally gauging the level of motivation, interest, and commitment of participants in the CTI course to the theme of “technical leadership” in the context of effective communication.

The following examples of responses to the survey and the interpretation of the responses and applications to CTI provide only a snapshot of the 29 surveys that were completed. However, the information provides some useful direction for the continuing development of CTI and has led to several innovations in course design, especially the selection and identification of guest lecturers for the course.

B. Survey Results and Implications for CTI/MEPP.

Survey Question #1:

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1. Define: “technical leadership.” Is it different from business management?

**#1 Representative Responses:**

* A technical leader needs to be able to zoom in or out at the technical detail level. He needs to be able to operate effectively at both levels. Being a visionary is key.

* Technical Leadership is the ability to use technical expertise, research, communication, and experience to lead others in solving technical problems and dealing with technical issues.

* Technical leadership drives product direction and capability. Business management faciliates/constrains these efforts to provide a future.

* Business management – “creating problems” – “we need to cut costs/reduce delivery time/etc.”
* Technical Leadership – “Problem solver” – “how can we cut costs/reduce delivery time/etc.”

**Applications to “Communicating Technical Information”:**

When “technical leadership” was first introduced informally as a theme in a previous CTI class, the discussion immediately focused on how (and if!) technical leadership was different from business management. The consensus of opinion seemed to be that technical leadership was something different and much more interesting overall to professional engineers. For one thing, many engineers have studied management as a business specialty and are aware that it is a huge subject; additionally, it is not what many engineers wanted to discuss. Note that MEPP is offered as a technical alternative to an MBA; participants in MEPP have self-selected themselves away from business management at least for the purposes of this program.

Technical leadership is no less a large topic, but it is not in general well discussed in specific detail. In the responses to question #1, there is recognition that business needs both management and technical leadership and that they depend on each other. Discussion will continue in CTI to characterize technical leadership and to differentiate it from business management.

**Survey Question #2:**

2. What are the key factors in technical leadership?

**#2 Representative Responses:**

* Staying current with technical skills and technical information applicable to one’s job;
* sharing ideas and training others in technical matters;
* defining technical goals within your company and implementing effective plans to achieve these goals;
* communicating technical information effectively to a wide variety of audiences.
Vision, leading by example, consensus.

Strong vision of what should be done and the discerning ability to separate the good and promising from the bad.

Strong communication skills! The ability to relate all levels of technical information to all levels of audiences.

Applications to “Communicating Technical Information”:
“Vision” and “communication” were mentioned frequently in the survey responses. There could be no better motivation for a course in Technical Communication!

Survey Question #3:
3. How does the “intellectual” capital of a company differ from the “ordinary” capital?

#3 Representative Responses:
Certainly it is more difficult to quantify, and in many organizations it is the real “soul” of the company.

Ordinary capital is money and tangible assets; intellectual capital is people and their ability.

It is more easily lost and very often not properly valued.

Intellectual capital is the mind – ideas and knowledge; ordinary capital is “hard” – money, machines, buildings, etc.

Applications to “Communicating Technical Information”:
As part of the movement into “the information age,” everyone from management on down is struggling with the shift from “machinery” to “mind.” Technical leadership depends on new ideas, research, information, innovative processes, and other examples of “intellectual capital.” The value comes when this intellectual capital is transformed into products or when it is otherwise used to add value to a business. This is a complicated and difficult “paradigm shift” – it deserves thought and discussion as engineers fulfill their roles as technical leaders and can provide material for discussion in CTI.

Survey Question #4:
4. What are some examples of “technical leadership”? Include examples from your work, other work you have seen in your company, or other examples from the world of business and engineering.

#4 Representative Responses:
In my company we are bringing a new product to market. In this example, the
A technical leader is required to lead the design effort, cost (budget), quality etc. Many varied skills are required.

Defining environmental, process engineering, and process control goals and implementing effective plans to achieve these goals.

Take upon yourself to improve a process or task that is not a direct job responsibility (implement an electronic part # system).

Fostering the cooperative development of all, raising the bar, providing a culture that promotes and rewards life long learning.

A technical leader in my company (an example) is an engineer who is comfortable and capable of doing independent research, continuously improves the processes and tools he uses to do his job, and excels in being able to explain highly technical, complicated things in a simple and understandable way in order to “sell” his ideas.

Applications to “Communicating Technical Information”:
Since CTI assignments are related to work and on-the-job problem solving, it will be essential to relate real requirements to the theme of technical leadership. Analyzing real work requirements and applying them to CTI assignments will be an essential element in identifying the best and most useful assignments so students see a close linkage between the skills taught in CTI, the demands of technical leadership, and the requirements of practical on-the-job problem solving. The responses in #4 are a small sampling of much more extensive discussion that will be necessary in CTI as students relate their work to their CTI assignments.

Survey Question #5:
5. What are the communication tools that are essential for “technical leadership”?

#5 Representative Responses:
Verbal skills; presentation skills/software; written skills - email, word processing.

The key is involvement. People don’t want to be left in the dark.

Effective written and oral presentation skills; listening skills; computer hardware and software to analyze and present data effectively; journals and the internet, books, corporate manuals, co-workers, etc., to gather information on technical topics.

Relationship maintenance; presentation skills; research abilities and routes.
Oral communication – preparation to take the complex and make it simple, while at the same time not “dumbing it down.”

Self confidence!

Good report writing skills. Good verbal communication skills in environments like meetings. Good presentation skills when you are the subject matter expert.

Applications to “Communicating Technical Information”:
Naturally, the answers to question 5 were gratifying for the designer and instructor of a course in technical communication. Past course evaluations have ranked CTI high in utility – most people recognize that even when communication is not part of their official job description or even if it is not their favorite task, all aspects of communication are essential for getting a job done. There is some good recognition here that “information is not enough” – that effective presentations and persuasion are necessary. There is also the beginning of a good awareness of audience analysis – the requirement to understand your audience and to meet its needs, whether technical or non-technical. The number and variety of presentation opportunities in the CTI syllabus are designed to provide a broad base of “real” communication experiences and to build expertise and “self-confidence.”

Survey Question #6:
6. How do knowledge, information, and research build a basis for technical leadership?

#6 Representative Responses:
Without these, there is not much to communicate technically to your followers.

Provide confidence and a foundation to take the initiative.

They provide the confidence you need in the background in order to be effective.

“Technical Leaders” should act as a liaison between business management and “pure” technology resources.

Applications to “Communicating Technical Information”:
Research methodologies are part of both CTI and the following course, Independent Reading and Research in Applied Engineering (IRRAE; see MEPP course overview). Advanced research skills through the electronic databases of the Wendt Engineering Library are taught as part of CTI. Additionally, one CTI guest lecturer will be from the Wendt Library business research service to give examples of how research adds value to most technical business endeavors. This is the information age; the competitive edge now, more than ever before, depends on knowing how to find and use information.
Survey Question #7:
7. How does the concept of “technical leadership” affect you and your vision of yourself in your profession? Do you value the role of “technical leader”?

#7 Representative Responses:
I consider technical leadership skills to be a required skill for my engineering development.

Yes. Puts pressure on me to continue my development in areas of communication to improve my effectiveness as a leader.

Yes I would like to become one. I look up to technical leaders.

It can be very difficult to work for someone who lacks these skills. I hope it is an area that I can excel in. It is expected of me in my job.

Fundamental to my career development.

I’m on track to become chief technical officer for my company, currently transitioning into the role of Technology Center Director. If we do not find a way to embrace the introduction of new technology by making it manageable for our working people, we will falter.

I think it is very important to have technical knowledge in leaders. How can they lead me if they don’t know my role?

The technical leader is a valuable role in any company that involves engineers and technology.

Yes, I value the challenge. It is a very important responsibility.

Applications to “Communicating Technical Information”:
There is almost universal agreement that the role of “technical leader” is part of the career development plan for most MEPP participants. The linkage of technical leadership and communication skills should help make CTI a valued course when seen in this light.

Survey Question #8:
8. Are there any special “ethical concerns” that affect technical leadership.

#8 Representative Responses:
Concern over product safety both in manufacturing and for the end user. That is usually at a higher level than in the business sector.

Technical leaders must always focus on safety and environmental concerns when
designing, building, and operating facilities.

Maintaining proprietary information.

We have to find a way to combine excellence with humility.

The science must be ready – know the difference between R&D, pilot runs vs. production runs.

As with any type of leadership, an effective leader can lead his followers to disaster or evil.

Applications to “Communicating Technical Information”:
The ethics of new technologies, risks, unforeseen dangers, and environmental issues are excellent concerns that should be part of every discussion of technological innovation. The awareness of the “ethical” issues of communication relating to technical leadership could be improved, and an opportunity exists for work on the ethical dimensions of communication to persuade or propose new technologies, or the challenges of balancing risks and benefits and communicating these concerns effectively. There is some awareness of the issue of “proprietary information” and the ethics of keeping company information confidential.

Summary Statement for Survey (final “overview question”):

Summary statement
How might “technical leadership” become an effective theme for your work in CTI?

Representative Responses:

The main area in need of improvement for me and many engineers is communication especially in presentations. This is a major area that I think holds engineers back from being able to advance into leadership positions that they are technically qualified to perform.

Aspiring to be a great technical leader starts with practice. Principles of technical leadership can be used in CTI for the classwork, especially the project, for exactly that purpose.

This is everything – it sums up all of my career goals. Put me on your mailing list for discussions!

I will keep in mind that it is insufficient to just relay information – I need to help drive decisions.

Note: The company I currently work for is populating its upper level management
Applications to “Communicating Technical Information”:

Part of the strategy for any successful course is to inform participants of the major goals and content of the course and to gain approval from the participants for the major course themes. As of the time of this survey, it appears that the goals and themes of “Communicating Technical Information” will mesh effectively with the expectations and needs of the class participants. The focus on “technical leadership” is a useful way to organize all the communication, research, and presentation content of a technical communication course.

C. Next step – Stage 3 of course development.

Stage 1 – was reported in a previous ASEE paper (Ross, 2002). The present paper is at least a starting point for Stage 2. Stage 3 will become possible as managers and business in general can have time and opportunity to respond to the accomplishments of participants in MEPP/CTI. Whether the efforts of technical leaders are valued and encouraged will be the final proof of the practical value of “Communicating Technical Information” as a contribution to the career development of practicing engineers. This evaluation may never be complete, but preliminary results will be the material for the next report to ASEE on the development of CTI in the MEPP program.
References


Appendices

Appendix A: Overview and Course sequence of MEPP

The Master of Engineering in Professional Practice is a two year program delivered on the web.

Each semester, a class of about 30 participants completes two courses, moving through the program toward graduation after four semesters and two summers.

Week-long summer residencies are required, permitting the opportunity for participants to become acquainted face to face with each other and with their instructors. The summer residencies also permit the opportunity for social and academic activities on the UW-Madison campus at a beautiful time in the summer.

In 2002, the University Continuing Education Association (UCEA) honored MEPP in two categories:
- UCEA's Distance Learning Community of Practice
- UCEA's Outstanding Credit Program Award

In 2003, the U.S. Distance Learning Association (USDLA) has also honored MEPP: Award for Excellence in Distance Learning Programming in Higher Education.

For more information about MEPP, visit:  http://mepp.engr.wisc.edu/

**Overview of MEPP and the placement of “Communicating Technical Information”:**

<table>
<thead>
<tr>
<th>Year 1 - Summer</th>
<th>Year 1 – Fall</th>
<th>Year 1 – Spring</th>
<th>Year 2 – Summer</th>
<th>Year 2 – Fall</th>
<th>Year 2 – Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Summer Residency on UW-Madison Campus</td>
<td>Engineering Economic Analysis and Management 3 credits</td>
<td>Engineering Problem Solving with Computers 3 credits</td>
<td>Second Summer Residency on UW-Madison Campus</td>
<td>Engineering Applications of Statistics 3 credits</td>
<td>Quality Engineering and Quality Management 3 credits</td>
</tr>
<tr>
<td>Network Skills 1 credit</td>
<td>Technical Project Management 3 credits</td>
<td>Communicating Technical Information 3 credits Paul Ross</td>
<td>Independent Reading and Research in Applied Engineering 1 credit</td>
<td>International Engineering Strategies and Operations 3 credits</td>
<td>Engineering and Business Data Communication and the Virtual Office 3 credits</td>
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Note the strategic position of “Communicating Technical Information” at the end of the first year. It provides support for advanced work in other technical courses as well as for IRRAE in the following Summer.

The author expresses appreciation for the many friends and colleagues who have made MEPP and CTI possible.

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Appendix B: The Technical Communication Program at UW-Madison

The Technical Communication Certificate Program (TCC) at UW-Madison resembles a “minor” degree program, requiring 24-credit hours of work to complete the program. Besides work in general technical communication, editing, and oral presentations, elective courses include web design, teams, electronic publishing and user manuals. Other courses outside technical communication are selected from approved course in communication, computer science, math/statistics, and management/business/economics. Students may also work in all phases of the production of Wisconsin Engineer, the award-winning college engineering magazine; and, as a capstone project, TCC students complete a practical internship which requires substantial “real” technical communication work “on-the-job.”

About half the undergraduate students taking the TCC are first and foremost engineers who want to add communication to their technical skill base; about a quarter have a special interest in communication because of a career emphasis on technical marketing or sales; and about a quarter are students who want to make technical communication their primary career. Most students are from the College of Engineering, but a substantial number are from other science and technology areas as well as from English and other liberal arts departments.

The Technical Communication Certificate Program (TCC) is primarily an undergraduate campus based program. In addition, The Technical Communication Program at UW-Madison teaches a graduate course on campus (mostly serving Masters and PhD students and those preparing papers for conferences and for publication). Finally, as part of the Engineering Professional Development department, the Technical Communication Program teaches short courses on campus and in-plant for working engineers on-the-job.

For more information, visit the TCC program at: www.engr.wisc.edu/epd/tc
Appendix C: A Preliminary Bibliography for “Technical Leadership”

The books and articles on this list provide some starting points for the current increasing interest in technical leadership and its value, especially for engineers and other technical innovators.

The materials on Challenger, listed in references, should also be consulted.


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Appendix D: Survey Completed by MEPP Students, Summer 2002

Question: Does “Technical Leadership” Matter to You and Your Future?

Please hand in this form at 1145. name (optional) ________________
Do you want to talk about this more?
   – please give your name and email:

Please comment on the following questions; you do not have to say something on every one – just on the ones you think are most useful.

1. Define: “technical leadership.” Is it different from business management?

2. What are the key factors in technical leadership?

3. How does the “intellectual” capital of a company differ from the “ordinary” capital?

4. What are some examples of “technical leadership”? Include examples from your work, other work you have seen in your company, or other examples from the world of business and engineering.

5. What are the communication tools that are essential for “technical leadership”?

6. How do knowledge, information, and research build a basis for technical leadership?

7. How does the concept of “technical leadership” affect you and your vision of yourself in your profession? Do you value the role of “technical leader”?

8. Are there any special “ethical concerns” that affect technical leadership.
Summary statement
How might "technical leadership" become an effective theme for your work in CTI?