PREPARING STUDENTS FOR GLOBAL ENGINEERING WORKPLACE COMMUNICATION

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1. INTRODUCTION

In the rapidly changing global workplace, engineering students need to be aware of international and intercultural communication dynamics. Indeed, ABET 2000 asks that students become aware of the social impacts of their professional work as well as being able to "communicate effectively." In studying international communication, this awareness extends far beyond issues of language. Students need to become familiar with concepts such as globalization, localization, and translation of visual and verbal communication.

Engineering educators may wish to incorporate more of these perspectives into their courses but may be concerned that other important goals will be pushed aside. However, one may be able to include existing goals while layering others on top that will help students explore international perspectives while not increasing the course workload dramatically.

This presentation will discuss theories and principles that guided the redesign of our institution's senior level engineering communication course to emphasize international engineering communication. It will explain the rationale for the assignments that were created. It will also discuss the advantages that we have observed in the redesign of the course. Finally, it will explore possibilities for enhancing students' global communication abilities in courses beyond technical communication courses.

2. THEORIES AND PRINCIPLES

Understanding international engineering communication means addressing issues that go beyond mere translation from one language into another, important though that is. At least four major principles guided the redesign of the course: bringing tacit conventions to consciousness, working to eradicate ethnocentric attitudes, locating communication conventions within the context of a world view, and understanding differences between globalization and localization in international engineering communication.

Bring tacit communication conventions to consciousness. In cross-cultural communication, tacit "rules" within a given culture's communication behaviors can create obstacles to effective

communication if those differences are not consciously known to the individuals engaged in the communication. As Ulijn and Campbell (2001) have argued, "Patterns of communication behavior…are deeply rooted in language-culture complexes" (p. 77). Raising tacit communication conventions to consciousness may prove difficult because people have learned many of these conventions from smallest childhood. These conventions have been reinforced through multiple means throughout one's life. These language behaviors exist within a larger context and frequently the "complex of language, social rules, and rituals that make up the shorthand term 'culture' is largely outside our conscious awareness" (Ulijn and Campbell, 2001, p. 78). The practice of these conventions becomes like second nature. Only when one of these conventions is violated does one become conscious of it. These conventions include but are not limited to:

- turn-taking behavior in speaking,
- appropriate volumes and rates of speaking,
- the roles of oral and written discourse within the cultural practices,
- the relationship of language to one's role within an organization,
- body language and proximity,
- the use of visuals,
- levels of explicitness,
- directness/indirectness strategies,
- polite communication behaviors, and
- general ways of reasoning.

Ulijn and Campbell (2001) also note that tacit communication rules affect how people "show deference to people higher in the social hierarchy, conduct courtships, acknowledge their bonds of identity through ceremony, even how close they stand to one another on a bus" (p. 77). Through direct instruction and discussion, students in our international engineering communication course begin the process of making their tacit knowledge of these conventions overt. They are also able to begin understanding that other cultures may have other tacit conventions that can cause misunderstandings when individuals from differing cultures interact. This awareness may lead to greater success in international dealings (Ulijn and Campbell, 2001).

Working to eradicate ethnocentric attitudes In this course, we encourage students to understand that in cross-cultural situations, one's own way of communicating is not the "correct" one. Many times when one learns about another culture's customs, one tends to think, "Yes, I understand their customs, but really my culture's ways of communicating are the best ways." This course seeks to begin to eliminate that perspective because it can prove detrimental in international communication situation. This process has proven to be challenging.

Locating communication conventions within the context of a world view Iin this course we stress that cultural communication conventions are located within a larger context, a world view. For instance, a culture that places a greater emphasis on the group than on the individual will communicate in ways different from those cultures that emphasize individual rights. Similarly, views of authority and expertise will affect how one communicates and reasons. If a culture highly values the wisdom of the elders, simply quoting an elder's words can provide enough reason for a given behavior or decision whereas a culture that values empirical reasoning will

expect empirical evidence to guide decisions. Indeed, if a document or oral presentation is to be "truly global it must communicate in the languages and cultures of its users" (Kuusto, 2001, p. 355) and listeners.

Understanding differences between globalization and localization In this course we stress the implications of "globalization" and "localization" in engineering communication (Watkins, 2001, p. 4). Globalization involves making communication clear to as many people in as many cultures as possible. For example, one might use widely understood symbols, such as a red circle with a diagonal line across to indicate that something is forbidden. Globalization is challenging, but it deserves attention within the course. Localization, on the other hand, involves transforming one's communication to fit local circumstances and cultures. The Red Cross substituting their red cross symbol with the symbol of a red crescent in Islamic countries is a well-known example of this. Such localization demands that a communicator be sensitive to cultural dynamics of a local culture. In this course, we begin to look at the problems that arise in communication that may need to be globalized or localized and the processes for doing so.

In utilizing these four principles, we look beyond the surface level of language and culture and "discuss the deeper structures, conventions, norms, symbols, presuppositions…In other words, we need to discuss the communication event and culture where both language and communication are essentially embedded" (Kuusto, 2001, p. 356). These principles play into the design of the course projects.

3. RATIONALE FOR ASSIGNMENTS

Several of the course goals that guided assignment design came from our previous engineering communication course (see appendix for a syllabus of the revised course). These existing goals included:

- Learning how to shape oral and written communication experiences based on a solid theoretical foundation.
- Shaping discourse with both persuasive aims and with explanatory aims, two of the most common purposes in engineering communication.
- Gaining awareness of and practice in the recursive processes that contribute to the shaping communication.
- Analyzing contexts in order to shape communication appropriately for workplace situations.

In redesigning the course, we also added features intended to enhance students' international and cross-cultural communication abilities. Goals included:

- Collaborating with people from many cultures. This was accomplished by having the students work in groups with students from many different countries. The ability to communicate effectively on teams is central to effective global projects (Sadri and Flammia, 2003).

- Collecting information about new cultures. This was accomplished by requiring students to conduct research about the business and technical communication practices in other countries and about the cross-cultural implications of off-shoring.
- Designing usable communication suitable for translation, globalization, and localization.

Table 1 indicates the skills that each assignment allows students to develop.

Table 1: The assignments in the course provided opportunities to develop a range of cross-cultural communication abilities.

Assignment / Skills/goals	1. Briefing Report	2. Job-hunting materials	3. Instructions	4. Off-shoring recommendation report
Oral Communication	X		X	X
Written Communication	X	X	X	X
Persuasive Aims		X		X
Explanatory Aims	X		X	
Recursive Process	X	X	X	X
Situated in Realistic Workplace Settings	X	X	X	X
Cross-cultural collaboration	X		X	
Research into other cultures	X	X		X
Communication usable in varying cultures			X	

In project #1, student groups prepare oral and written briefing reports to colleagues who will have to travel to another country to complete technical work. This assignment is placed at the start of the course in order to allow students to conduct research into cultural communication conventions with which they may not be familiar and to heighten their awareness that communication effectiveness is based on cultural expectations, not on absolute rules.

In project #2, students individually prepare job-seeking materials for jobs in the United States and in another country. This assignment requires that they conduct research into the hiring communication conventions in another culture and helps them to realize that typical communication practices in the U.S are not necessarily global. Project #2 also allows the students to move from discourse with an informative aim, as created in Project #1, to discourse with a persuasive aim.

In project #3, teams of students prepare instructional oral and written communication for users from many different backgrounds. In this assignment, we focus on issues of translation, localization, and globalization as the students design texts and training experiences. We also focus on issues of usability of instructions across cultures and languages. Because creating procedural discourse is difficult, this assignment comes third in the sequence.

In project #4, students as individuals prepare recommendation reports (oral and written) to try to persuade decision makers either to send technical work offshore or to keep it in the U.S. Again, students gain practice in supporting their arguments with research. In this final project, students are faced with an even greater persuasive challenge than they were in Project #2.

In this course, the professor and the textbook provide students with perspectives on principles of effective international and cross-cultural communication. The projects discussed are graded on criteria that we have developed over time. The course is designed for people who are near to graduation, so it may seem that it is a bit late in the curriculum to have them begin to think globally. However, because many of the students are relatively mature, they seem ready for the idea that communication is more than rules and forms, but a matter of adapting appropriately to a given situation.

In all of the course activities, we retain goals from the previous version of the course while including new ones. The numbers of assignments and the work level have remained approximately the same as in the previous version of the course.

4. ADVANTAGES TO THE REDESIGN

Although we're in the midst of teaching this version of the course for only the third time, we have a few preliminary results to report. In general, this redesigned course has been received well. Quantitative evaluations at the end of the semester have gone up slightly. Students engage fully in the projects and group work. They raise issues in the classroom that show they have been integrating what we do in class with what they see in their lives outside of class. We have noticed that the international students frequently take on leadership roles in the groups, enthusiastically contributing their perspectives to the thinking of the group. We hope to design a more formal assessment at some point in order to assess more general goals.

Student comments on evaluations include:

- "This course has helped me to see things from international and technical perspective."
- "The projects were helpful in simulating and preparing for the experiences we will encounter."
- "I learned different aspects of communication with respect to international technical expectations."

A final advantage – both my colleague at IUPUI and I are enjoying teaching the class more. The improved interest and engagement on the part of students who are taking the course helps to motivate us. We are also learning a great deal ourselves.

5. ENHANCING GLOBAL AWARENESS THROUGHOUT THE ENGINEERING CURRICULUM

Global awareness for engineering students should not be limited to one course if it is to be successful. Faculty in many disciplines can contribute to expanding students' awareness of cultural and international dynamics in engineering practice. This rethinking can integrate current curricular goals while emphasizing new ones, as I've demonstrated in this redesign.

In courses throughout the engineering curriculum, valuable changes that emphasize international issues might be made in the following ways:

- Courses in engineering design can emphasize design processes that take into account users from many cultures.
- Courses in engineering ethics can explore the cultural variables that may influence ethical decision making.
- Service learning projects can deal with designs that are influenced by international and inter-cultural variables.

As Sadri and Flammia (2003) argue, deliberate study of international technical communication is beneficial to students because "they need to be made more aware of and sensitive to the diversity within our workforce, even if they will never be exposed to international communication" (p. 86). Engineering educators who are concerned about preparing students to communicate effectively in the varying and unpredictable situations they are likely to encounter will benefit by revisiting their courses and applying creative thinking to how they might expand students' perspectives to function – and communicate – more effectively in today's global community.

REFERENCES

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Ulijn, Jan M. and Charles P. Campbell. (2001). Technical innovation and global business communication: An introduction. *IEEE Transactions on Professional Communication*, **44**, 77-82.

Watkins, John, Ed. (2001). *The guide to translation and localization: Preparing products for the global marketplace.* American Translators Association. Lingo Systems: Portland, Oregon.

APPENDIX: SYLLABUS FOR THE REDESIGNED ENGINEERING COMMUNICATION COURSE

TCM 360 -- Communication in Engineering Practice Dr. Marj Rush Hovde

The goals of this course are to:

- enhance your ability to write and speak in ways required of people in business and industry
- improve your skills in selecting, organizing, and presenting technical knowledge to audiences in organizational settings
- hone your ability to understand and manage your communication process.
- expand your understanding of international issues in technical communication

Textbook and Supplies

Technical Communication in the Global Community, 2nd ed. Deborah Andrews
One blank videotape, two computer disks.

Writing and Speaking Assignments

The documents and speeches you prepare for this course will be similar to those that you will create on the job. You will prepare them for specific organizational audiences. Therefore, they will need to be technically accurate and professionally presented.

Project #1 Briefing Report 10 points + 10 points

Working in a group, you will prepare an oral and written report for people in your workplace who will need to travel to another country. Specifically, you will inform them about the technical communication expectations in the cultures that they will be visiting.

Project #2 Application Letters and Résumés 10 points

You will design application letters and traditional and scannable résumés to use in job-hunting. In doing so, you will consider the audience, the contents of the documents, the image you wish to project, and a design that aids readability. You will customize the application letters for specific jobs that you might pursue. You will prepare one set of materials for applying to a job in the United States and another set for applying for a job in another country.

Project #3 Instructions Suitable for Translation 10 points + 10 points

As teams, you will prepare a set of instructions suitable for translation and localization. You will also prepare an oral training session for users from multiple language backgrounds. In this project, you will pay close attention to style and visual communication in order to make your instructions accessible to international audiences.

Project #4: Problem/Solution Report 20 points +20 points

You will write a report that is designed to help an organizational audience decide whether to contract its technical work to people in another country. Your report should seek to convince your readers to agree with your analysis and/or to decide favorably on your recommendation.

Based on your written work, you will present the results of your investigation orally to classmates who will role-play decision-makers who have the power to accept or reject your proposed solution. You will structure your presentation to influence your audience, creating a confident and competent image.

Optional Project: Report on current international technical communication. Up to 5 points extra credit

You'll prepare a brief oral and written report on current international events in technical communication. You will conduct research and prepare concise materials to present orally and in writing to classmates regarding recent events.

Class participation, drafts, quizzes, and planning materials – 10 points

Because this is a participation course, you need to attend classes regularly. I expect that you will give and receive feedback on drafts and that you will contribute to the class with useful questions and insights based on your reading and experiences. In addition, we will use the Forum feature on Oncourse for out-of-class discussions. You will be expected to read this and contribute at least once every two weeks.

In addition to writing documents and giving speeches in this course, you will also write drafts and participate in discussions leading up to those documents and speeches. Your planning materials, early drafts of papers, and class discussion times will count towards your class participation grade. (I anticipate that you will spend a minimum of 6-8 hours per week on work outside the class.)