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A View of Oral Communication Activities in Food Science From the Perspective of a Communication Researcher

Denise A. Vrchota
Iowa State University, vrchota@iastate.edu

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Keywords

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Disciplines

Health Communication | Higher Education | Interpersonal and Small Group Communication | Other Food Science | Speech and Rhetorical Studies

Comments

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A View of Oral Communication Activities in Food Science

From the Perspective of a Communication Researcher

Denise Ann Vrchota

Iowa State University

Communication Studies Program/Department of English

310 Carver Hall

Ames, Iowa 50011

Contact Information

Denise Ann Vrchota

Iowa State University

Communication Studies Program/Department of English

310 Carver Hall

Ames, Iowa 50011

Phone: 515.294.0501

FAX: 515.294.2934

E-mail: vrchota@iastate.edu

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Abstract

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A View of Oral Communication Activities in Food Science
From the Perspective of a Communication Researcher

Introduction

A recent survey pronounced the Institute of Food Technologists (IFT) Success Skills (Iwaoka 2011) to be the most important competencies mastered by food science graduates entering the work force (Bohlscheid and Clarke 2012). Success Skills address a range of communication competencies food science students must master as part of their professional preparation (See Table 1). This qualitative study is motivated by the important role the Success Skills play in the food science curriculum and the essential relationship of oral communication and the food science discipline. The purpose of the study is to identify the oral communication activities in the food science curriculum that support the communication success skills and suggest methods from the communication discipline to further develop these activities that play a crucial role in the professional preparation of food science students.

The published research that describes communication activities in food science classes is testimony to the importance food science faculty place on communication. In addition to the surveys conducted by food science faculty that monitor the extent of student frequency of use and preparedness of the communication outcomes found in the Success Skills (Bohlscheid and Clark 2012; Clark and others 2006), there are published accounts of communication activities designed by food science faculty in order for students to learn and practice these important skills (Barringer 2008; Boylston and Wang 2003; Corey and Firth 2013; Duffrin 2003; Harper and others 2006; Hayes and Devitt 2008; Neal and others 2011; Reitmeier and others 2004).

The communication discipline offers a situated communication framework (Dannels 2001) proposing a connection of orality and disciplinary content that explains the essential role of communication in the food science discipline. According to the framework, as students communicate with each other, they are also learning disciplinary content, practicing the communication traditions of their discipline, and becoming knowledgeable about standards of argument and advocacy within the discipline. For example, as a food science student develops a presentation for the food product he or she made in a food laboratory, the student also learns the disciplinary content relevant to that food product, selects the appropriate sensory terminology to describe the product, and practices the discipline-sanctioned ways of speaking and acting as the product is presented. The aggregate of students' communication experiences across the curriculum become a crucial component of professional preparation. However, according to Morgan and others (2006), despite the central role of communication in food science, students are not taught specific communication skills, particularly for group and interpersonal interactions; rather they participate in activities that are assumed to enable them to acquire these skills. Dannels (2005) cautions researchers who study communication traditions in the disciplines to approach their work with curiosity, to honor the disciplinary tradition and work within these traditions. The present study intends to do just that.

This qualitative study reports the results of an examination of oral communication activities in the classes of nine faculty in the food science program at Iowa State University that support the IFT Success Skills core competency. The willingness of the faculty to welcome a communication researcher into their disciplinary spaces and observe their classes provides a valuable opportunity to extend communication knowledge about the role of communication in other disciplines. In that same spirit, the purpose of this discussion is to provide insights and

suggestions from the communication discipline in response to the findings that emerged from this study.

Table 1. Portion of Table from “Core Competencies in Food Science” Showing Success Skills Core Competency. (IFT, 2011).

| | | |
|---|---|---|
| Success skills (Success skills should be introduced in lower level courses and practiced in as many upper division courses as possible) | Communication skills (i.e. oral and written communication, listening, interviewing, etc.) | <ul style="list-style-type: none"> • Demonstrate the use and practice of different levels of oral and written communication skills. This includes such skills as writing technical reports, letters and memos; communicating technical information to a non-technical audience; and making formal and informal presentations. |
| | Critical thinking/problem solving skills (i.e., creativity, common sense, resourcefulness, scientific reasoning, analytical thinking, etc.) | <ul style="list-style-type: none"> • Be able to develop a process for solving and preventing reoccurrences of ill-defined problems; know how to use library and internet resources to search for quality information, and solve a problem; and make thoughtful recommendations. • Apply critical thinking skills to new situations. |
| | Professionalism skills (i.e., ethics, integrity, respect for diversity) | <ul style="list-style-type: none"> • Commit to the highest standards of professional integrity and ethical values. • Work and/or interact with individuals from diverse cultures. |
| | Life-long learning skills | <ul style="list-style-type: none"> • Explain the skills necessary to continually educate oneself. |
| | Interaction skills (i.e., teamwork, mentoring, leadership, networking, interpersonal skills, etc.) | <ul style="list-style-type: none"> • Work effectively with others. • Provide leadership in a variety of situations. • Deal with individual and/or group conflict. |
| | Information acquisition skills (i.e., written and electronic searches, databases, Internet, etc.) | <ul style="list-style-type: none"> • Independently research scientific and nonscientific information. • Competently use library resources. |
| | Organizational skills (i.e., time management, project management, etc.) | <ul style="list-style-type: none"> • Manage time effectively. • Know how to facilitate group projects as well as be a good team member. • Handle multiple tasks and pressures. |

Practical Application and Objectives

A communication tradition that emerged from this study is that faculty do not explicitly teach communication skills, rather they design activities in which it is assumed students will acquire the skills through participation in the activities. However, without instruction, students may “luck out” in one activity without being conscious of their communication in that activity, thus impeding their ability to apply that skill in other activities or classes. Additionally, the ability of students to transfer these important skills to professional contexts may be compromised. The objectives of this study are 1) to identify oral communication skills found in activities in one food science program that support the communication Success Skills; 2) to suggest activities designed to direct students to the specific skill sets inherent in the oral communication activities in the Success Skills while enabling faculty to maintain the communication traditions of food science as they prepare students for professional practice. (NOTE: In the interests of brevity, when the term “communication” is used throughout this discussion, unless otherwise indicated, the reference is to oral communication.)

Materials and Methods

Research Site

The results presented here are part of a larger qualitative study conducted in the FSHN Department that began when the department communication task force offered a series of professional development workshops on oral communication made possible by an internal curriculum grant. The interest in oral communication shown by the faculty during the workshops and their subsequent knowledgeable questions and observations suggested this might be an appropriate site for a baseline study; that is, a study to gain understanding from the

perspective of the faculty participants. Although there are several programs housed in the department, the data reported here are specific only to faculty members who affiliated with the food science program.

Participants

For this study, an understanding of the communication traditions in food science from the perspective of nine faculty volunteers was constructed. As is true of many ethnographic studies, the small number of participants is not statistically representative; however, their value to this study lies in the extent of their participation in the food science program, their commitment to integrating communication into their classes, and their professional credentials and expertise. Patton (2002) refers to such a sampling as “purposeful” (p. 230) e.g., the practice of selecting a small sample of individuals whose expertise and perspectives illuminate the issue examined. These individuals are active in the food science program and the food science profession and their professional commitment and efforts to integrate communication activities into their classes made them particularly well suited for this study.

Data Sources

Three data sources were used for the study. First, after receiving approval from the institutional review board, semi-structured interviews were conducted with each of the nine faculty to elicit descriptions of classroom communication activities. The letter accompanying the consent form inviting participation indicated the focus of the interviews would be the communication activities they integrated into their food science classrooms and suggested possible topics such as: “communication activities in food science classes” and “the communication needs of professional food scientists.” The interviews occurred at a time and

location convenient to the faculty, typically an office. A microphone and recorder were placed in a visible location to tape the interviews. The researcher took notes and asked follow-up questions as more information or clarification was needed. Initially faculty were informed the interviews would last one hour; however, two of the participants voluntarily continued the discussions beyond the one hour mark. The interviews occurred before the researcher's observation of classes, a decision made for two reasons: 1st, to enable the researcher to understand the classroom context and course content; 2nd, to allow faculty to identify classroom communication activities they would like the researcher to observe, a decision often arrived at as a result of their interview remarks.

Notes taken by the researcher during observations of classes taught by the faculty comprised the 2nd data source. The researcher's goal was to attend a minimum of one class of each faculty to observe a communication activity. That goal was realized although in some instances the researcher observed more than one class taught by each faculty when student presentations occurred across several class periods or other activities of interest were scheduled.

The third data sources were documents such as course syllabi, class assignments and assessment rubrics. The purpose of the syllabi was to become familiar with the purpose of communication activities within each course; the assignments and rubrics provided crucial information of the connection of communication to the food science discipline. In a few instances where copies of assignments and rubrics were not available or assignments were not accompanied by a rubric, informal follow-up discussions were held with faculty.

Data Analysis

Field notes from the classroom observations were reviewed, documents examined, and the interview transcripts read. For this qualitative study, the results were analyzed according to a flow model (Miles & Huberman, 1994) in which the data are reduced, arranged, and from which conclusions are drawn. Initially, the data were reduced, maintaining all units referring to classroom communication activities. Data units are defined here as any word, phrase, or sentence that contains a single thought about a classroom communication activity included in the Success Skills outcomes. Data units were then coded according to their goodness of fit with the Success Skills outcomes (Glaser and Strauss 1967, as cited in Corbin and Strauss 2008). Some data units were coded to multiple Success Skill outcomes. For example a data unit “not just hang on to one person but being forced to work with various people” was coded to the outcomes of “work effectively with others,” and “be a good team member.”

The following section summarizes and interprets the results of the data analysis and provides suggestions for exercises to supplement future iterations of communication activities designed to enable students to attend to the key communication concepts and skills inherent in each activity. The scope of this study is limited solely to the oral communication activities that support the Success Skills competency. The exercises are developed for implementation in ways that faculty believe will best support student learning. For example, questions contained in the exercises might serve as guides to classroom discussion or students could complete the exercises as precursors to participation in communication activities or respond to them following the activities as reflections of their work. The exercises can be graded independently of other activities or as part of a larger activity or even “required but not graded.”

Results and Discussion

This section is organized in order of the Success Skills content outcomes. A matrix taken from the *2011 Resource Guide for Approval and Re-Approval of Undergraduate Food Science Programs* that provides a detailed overview of the Success Skills and corresponding outcomes is found in Table 1. The 2011 Resource Guide can be accessed at <http://www.ift.org/~media/Knowledge%20Center/Learn%20Food%20Science/Become%20a%20Food%20Scientist/Resources/GuideApprovalUndergradFoodSci.pdf>.

Communication Skills Outcomes

The Communication Skills outcome pertains to both written and oral communication; however written communication was outside of the scope of this study, thus results of only those proficiencies relevant to oral communication are presented here.

Communicating technical information to a non-technical audience. A criticism expressed by faculty in any discipline is “our students are technically knowledgeable but they can’t communicate their knowledge to others.” The sentiment is particularly compelling in food science due to the vastness of the food industry where professionals are likely to interact with representatives from federal agencies, consumers, and members of other disciplines whose technical expertise lies outside of food science. In anticipation of the imperative for excellent professional communication skills in the food industry, the data reveal students are given multiple opportunities to practice communicating their technical knowledge to others. Students were challenged to communicate food science technical information to classmates majoring in other disciplines (often agriculture or engineering) through assignments that required them to participate in interdisciplinary group activities. Students with advanced coursework in areas such as statistics were deliberately partnered by the instructor with students who had less

preparation. When students complained to their instructor: “Well, I had to carry them more because they didn’t understand this,” or “I had to spend time teaching them,” the instructor followed up with questions about the way the students had approached this challenge.

The commonality of these examples is the need for students to analyze their listeners and convert their technical knowledge to terminology that will be understood by them. This process, called “audience analysis” in public speaking contexts, is just as necessary in interpersonal contexts. An adaptation of the audience analysis process for use in interpersonal contexts is found in Figure 1. The important factor in this activity is that students develop a basic profile of their listeners and allow this profile to guide them in the terminology they choose to speak to the listeners.

Making formal and informal presentations. The faculty used the terms “formal” and “informal,” to describe 2 general communication practices rather than to differentiate types of presentations, as the Success Skills outcomes indicate. Informal communication was typically the term used to apply to spontaneous or more impromptu communication as this individual’s description of interaction in a food science laboratory indicates:

They’re talking to each other, they’re talking to me, asking me questions, so there’s that kind of interaction at the informal level. There we go with the formal, informal again.

Presentations observed in classes differed as a result of the expectation of advance planning and required structure inherent in the assignment. One of the more spontaneous presentations gave students the opportunity to earn extra credit points by recapping the key ideas of class lectures. The instructor provided a brief, oral explanation of the assignment for the students but was frustrated by the length of the student presentations in contrast to the brief

speeches the instructor envisioned, including students' inclination to repeat large portions of the lectures rather than summarizing key points, the purpose of the assignment.

The more structured the presentation, the more value the assignment carried within the context of the class. For these, faculty provided carefully prepared assignments and detailed rubrics to students for use as preparation guides to help them "be able to communicate at that [formal] level". The rubric for one class presentation cited assignment expectations such as the use of correct terminology to describe the sensory characteristics of food, presenting food products as visual support, the inclusion of "scientific principles and special techniques relevant to the product," and specific delivery instructions for eye contact and voice clarity.

The communication discipline does not differentiate formal and informal types of communication or consider the "different levels" of communication as in the case of communication Success Skills outcomes. Indeed when communication is referred to as "informal," students may mistakenly believe that no preparation is necessary, or that the event is low priority. An alternate approach to the "formal/informal" designations is for students to develop messages consistent with their communication goal and the relational and contextual details relevant to the achievement of that goal. For example, responding to a question or offering an opinion in a professional meeting (or a classroom) could be construed as an informal presentation but has the potential to influence one's career (or possibly grade) depending on the content and communication skill inherent in the response, despite being offered without preparation. There are 2 ways that faculty can implement a contextualized approach to planning speeches.

First, rather than emphasizing the “formal” or “informal” status of a speech, give students the basic contextual characteristics of a speaking event: “you are persuading your boss to expand the market for the pasta sauce,” or “you are testing a new food product with a consumer group.” Next, students identify the desired outcome(s) of the speech, and identify the best approaches to speaking and delivery in order to attain those outcomes. Communication always matters, particularly in a professional context, and students should understand that the words uttered in a professional meeting or other interaction have no less impact than the words uttered when giving a speech.

Second, the “formal” presentations observed in the food science classes were very carefully orchestrated and the assignments and rubrics were so carefully constructed, they afforded instructional guidance to the development and delivery of the respective presentation assignments. Similar guidelines can be provided to students for more impromptu or spontaneous presentations. A typical format for this type of message is: 1) State opinion or response; 2) give example or reason to support or illustrate opinion or response; 3) restate opinion or response in different words for impact. Instructors can also designate specific points that should be made in each part. For example, the instructor whose students recapped lectures suggest students select one or two most important points from a lecture; give reasons to support their choices or illustrations to further explain; and repeat the point(s) by connecting them to a specific activity or context when students would need to apply them. Delivery expectations and time limits can be incorporated into the assignment. This approach provides some guidance yet avoids the more highly detailed nature of the structured presentations in food science labs. An example intended to provide guidance to students and for use as an assessment instrument is found in Figure 2.

Critical Thinking/Problem Solving Skills

Critical thinking and problem solving skills as characterized by the second Success Skill content are processes that often occur simultaneously since critical thinking is an integral part of solving problems. Huba & Freed (2000), p. 203, define the need for these outcomes in issues “having no clear cut answer” or about which “experts often disagree”.

Be able to develop a process for solving and preventing reoccurrences of ill-defined problems. Communication activities that challenge students’ critical thinking and problem solving abilities are consistent with the problem solving orientation in the food industry; however, the process itself may not always be transparent to students. This was the case in a quality control class where students received authentic data showing that cookies placed in a specific location of a cooking belt consistently emerged from the oven overcooked. After examining the data to locate the cause of the burned cookies, the students concluded, “everything looks to be in control.” But the instructor pointed out:

Your decisions are only as good as the data you get. The data you obtain is biased or inappropriate or there’s something wrong with it, or you’re not in control, then trying to set up a control chart on data that’s not in control doesn’t make sense. Right?

Sometimes you don’t get all the data or you don’t look at all the data. When we get into sampling, ‘Was the way you obtained the data appropriate? If it’s not, then do something different.’ Those are examples of what I’m hoping they’re going to see, things that are not right. So I talk to them about, ‘Well, estimate. Does it look right?’ If there’s something really strange, ‘Why did that occur? Is it real or is that an artifact of how you have obtained the data?’

The instructor's challenge "does it look right?" illustrates what Brookfield (1987) explained as the hallmarks of critical thinking, the importance of "challenging assumptions and exploring alternatives (p. 229)." Students may not have considered these important questions in their analysis of the data. There are a number of processes to guide critical thinking, among them the classic "reflective thinking sequence" (Dewey, 1910), that provides a framework for exploring issues similar to the burned cookie problem. An adaptation of the sequence is found in Figure 3. The sequence leads students through the issues that must be considered, helping them to organize their thoughts and encouraging them to consider a range of possibilities about issues where possible solutions may be multiple or at least not obvious. An additional benefit of the

1. Why is/are your listener(s) present? What is the knowledge they want or need to acquire?
2. What is/are your listener(s) demographics? Factual characteristics such a professional position, discipline represented, in some instances such as presenting to school children or the elderly, age may be important.
3. What do/does your listener(s) already know?
4. How can I speak to my listener(s) to take them from where they are now to where they want to go or where I want them to go? In this area, identify ideas that need to be presented, common areas of agreement or knowledge, ways to present ideas that will be understood and meaningful to the listener(s).

Figure 1: Communication Analysis for Interpersonal Communication
Activities

sequence is its flexibility, such as times when new information emerges out of sequence. For example, if a crucial piece of information necessary to understanding the problem emerges at later stages of the sequence, the discussion can revert to the earlier point in the sequence and resume working through the steps incorporating the new information.

In order to build in accountability and monitor students' progress through the sequence as well as encourage application of critical thinking skills, instructors can request written or oral summaries of the groups' conclusions at each point in the sequence. Since students sometimes

need encouragement to participate in group discussions, instructors can instill the expectation initially that students will conduct their critical thinking and problem solving aloud, by modeling this behavior during class discussion. The process illustrated in the reflective thinking process can be used with any configuration of students: students working in groups, student partners, and students individually.

Professionalism Skills

The communication outcome for the professionalism skills focuses on culture, recognized as a set of learned behaviors, beliefs, values, and other important shared characteristics condoned and maintained by a group of people. Working or interacting with individuals from other cultures requires developing an awareness of the way one's culture influences one's communication and the way that behavior may differ from others. According to published accounts (see, for example, Neal and others 2011), providing training for an increasingly diverse work force is an ongoing challenge for food science educators and the food industry.

Work and/or interact with individuals from diverse cultures. The food science faculty attempted to replicate intercultural communication opportunities by assembling groups of students with diverse demographic characteristics such as differing majors, learning styles, amount of work experience outside of school (A similar approach to developing a diverse work environment is described in Harper and others, 2003.). In a product development class, cultural diversity was analogized by assigning students from several majors to each group. The food science students needed to find ways to convey technical food science information to team members from business, marketing, and other disciplines in ways that could be understood by them. These experiences may be useful to students to create an awareness of their own

communication assumptions but other important factors may not be present that are needed to afford students' the experience of interacting with members of other cultures.

Stella Ting-Toomey (1999), an intercultural communication expert, believes that cultural knowledge, mindfulness, and communication skills are necessary in order to communicate with diverse others. Knowledge relates to students knowing their own cultural traditions; mindfulness is defined by Ting-Toomey as the awareness of one's own "assumptions, viewpoints, and ethnocentric tendencies" while "simultaneously, paying attention to the perspectives and interpretive lenses of dissimilar others (p. vii)." The communication component of Tin-Toomey's intercultural skill set has to do with learning and practicing appropriate communication with diverse others while cultivating knowledge of other's verbal and nonverbal ways of communicating as influenced by cultural traditions. Instruction in the ways that individuals communicate as a result of their cultural traditions, or even the knowledge that cultural traditions influence communication is imperative in order to prevent individuals from drawing conclusions that may cause misunderstandings or prevent culturally diverse individuals from working together.

One way to cultivate an awareness of students' own and others' cultural influences is by attention to nonverbal communication. Some researchers believe differences among cultures is based on the nonverbal coding displayed by a group of people as a result of their cultural influence (For additional information, see any of the works by Edward T. Hall¹). Nonverbal actions such as eye contact, facial expression, management of space and observation of time are examples of nonverbal actions that are influenced by culture. Following are suggestions for classroom activities intended to raise students' awareness of themselves and others nonverbal communication as it is influenced by culture.

I. Content and Organization. Does your impromptu speech (remarks) include these components?

___ A specific statement summarizing your response? (Ex: Genetically modified foods are not harmful to people.)

___ An example or reason to support your response? (Ex: Broccoli is a genetically modified food and it appears on many lists of healthful foods.)

___ A statement that summarizes and concludes your remarks? (EX: Genetically modified foods are not only not harmful to people, they are beneficial to peoples' diets.)

II. Delivery. As you delivered your impromptu speech (remarks) did you display these nonverbal actions?

___ Maintain eye contact with your audience?

___ Speak in a clear, fluent voice?

___ Exhibit other signs of confidence such as strong posture, minimal gestures, appropriate facial expression?

___ Respond to unanticipated questions or events with confidence?

III. Other. Does your impromptu speech meet these additional requirements:

___ Time requirement of ___-___ minutes.

___ Other requirements.

Figure 2: Informal Speaking or Remarks Assignment and Assessment

First, encourage students to become aware of their own nonverbal actions in order to become aware of others' responses to them. Questions such as, "when interacting with others, what is your facial expression?" or "the sound of your voice?" An exercise that lends itself best to a safe environment involves partnering students who are asked to discuss any topic they wish for several minutes. Following the discussion, partners independently write a brief description of what they saw and heard in their partner's nonverbal actions and what they, themselves, believe they looked and sounded like. The partners compare their descriptions. An alternate version of this activity involves videotaping students engaged in discussion, viewing the tape, and writing a brief assessment of what they saw and heard in themselves in response to these stimulation statements: "I looked like...;" "I sounded like...;" "If I were another person, I would like to interact with me because...;" "Something about the way I looked and sounded that I might cause concern or confusion to others is...."

A 2nd activity allows students to practice Ting-Toomey's skill set. Provide students with scenarios such as those in Figure 4 that rely on nonverbal actions that may differ from their own. Students identify the differing nonverbal actions and at least three ways they would interpret these actions, discuss the impact on their relationships of operating on the assumption that their own meanings are "correct" as compared to the considering cultural influences in the scenarios, and develop principles to guide them when encountering similar scenarios.

A final activity partners students with a member of another culture to experience firsthand the breadth of communication actions that can be attributed to culture, and to learn to negotiate these differences in ways that show appreciation for another's culture while also operating as an agent of one's own culture. The results of the experience can be shared with the

class in a brief presentation and, on the basis of their collective experiences students can develop principles to guide their interactions with members of other cultures.

1. What is the problem, task, opportunity (PTO)?
Why are we here? Why are WE here?
What are we supposed to accomplish?
Do we understand and agree on our charge?
2. Define the problem, task, opportunity (PTO).
What information do we know about the PTO? What do we need to know?
What are key causes & effects?
What do we need to do to accomplish our charge? Which of us will do what? When?
3. Identify and agree on criteria or criterion for solution.
What are non-negotiable criteria or criterion? What are our negotiable criteria or criterion?
4. Generate possible solutions. Work toward quantity.
5. Select solution.
Match possible solutions to criteria or criterion.
Select the solution that meets the greatest number of criteria, is data driven, and within the parameters of our charge.
6. Develop implementation plan, if part of charge.
How do we implement the solution?
Who assumes active roles in implementation?
7. Develop assessment or review procedure, if part of charge.
When will reviews occur?
Who is responsible for reviews?
What is review process?

Figure 3: Problem Solving & Critical Thinking Process*

*(Based on Dewey, J. (1910). How We Think. Boston: D. C. Heath.)

“Your lab partner does not make eye contact with you nor does he/she respond to your questions.” (Culturally influenced nonverbal: eye contact differs according to culture, some cultures assume to respond to questions would be an insult.)

“You and your study partner agreed to meet at the library at 6 p.m. It’s 6:45 p.m. and your partner has not yet arrived.” (The translation of time differs from culture to culture.)

“When your study partner arrives at the library you look for a table where you can work on your class project. You are surprised when your study partner sits on the same side of the table that you choose.” (Space is observed and managed differently from culture to culture.)

“It is difficult for you to tell when a member of your project group agrees or disagrees with the rest of the group because his/her facial expression does not seem to change. (In some cultures, facial expressions are not animated. In other cultures, negative facial expressions are avoided so as not to disrupt the harmony of the occasion.)

“You are worried that your instructor did not clearly indicate there would be a quiz in class today and you are unsure whether you should study. The lack of information makes you very upset because you feel it is your right to know. The person next to you in class is not worried and does not hold it against the instructor that a definite statement about a quiz was not made.” (Some cultures are more tolerant of lack of information than others.)

Figure 4: Intercultural Scenarios

Interaction Skills

According to the data results, the interaction skills were the focus of the majority of communication activities in the food science classes observed. The outcomes of the interaction skills are largely relevant to interpersonal and group contexts so the finding makes sense because, in the food industry as in most other industries, communication is not conducted through presentations but through interpersonal and group contexts.

Work effectively with others. The data analysis for this study revealed two types of activities in which students practiced working effectively with others: students' interaction with other members during group work and participating in communication activities that required students to interact with individuals in contrived professional situations who held differing positions of responsibility, also known as "directional communication."

Although the faculty encouraged students to confer with other group members as they worked on group assignments, thus enabling them to practice working effectively with others, students often elected to work alone rather than coordinating their activities. To encourage students to talk to each other, the instructor of a canning class hid the can opener and other equipment, requiring students to interact in order to negotiate the sharing of equipment and eventually resulting in other alliances between them. Due to the need for professionals in the food industry to quickly develop working relationships with new co-workers that occurred due to shift changes, personnel changes, or other characteristics of a fluid work environment, one faculty described a rotation schedule that assigned group members to work with different group members on a regular basis in order for them:

To interact with different people that have different personalities, different skills. So having the opportunity to not just hang on to one person but being forced to work with various people is something they are going to need to do [as professionals].

The faculty also designed activities around contrived scenarios that required students to communicate with individuals at differing locations, upward, downward, or laterally, compared to their own position on an organizational chart. According to the faculty, consistent with industry practices, most of the classroom assignments required students to deliver upwardly directed messages such as in a quality assurance class where students acted as consultants, making recommendations about plant sanitation to a reluctant CEO; other assignments allowed students to practice lateral communication when they role played shift managers at a food processing plant who informed the manager of the following shift about the work to be done during that time; there were also opportunities to participate in downward communication, such as an exercise when students practiced strategies to train a new person who might have minimal experience and education, to work on the line.

- 1) What is the role (professional/assigned/ supervisory, etc.) of the person with whom I will be working during this activity?
- 2) What is my role (professional/etc.)?
- 3) With our differing/similar roles, how can we work together to complete this task?
- 4) Regarding the task to which we have been assigned, in what areas do we differ in our knowledge? In what areas do we have similar knowledge?
- 5) Considering our professional and knowledge differences/similarities, what could I be prepared to suggest? What task(s) could I be prepared to take on?
- 6) How could I inform the other of what I would like the outcome to be of our work together?

Figure 5: Reflection Questions for Working Effectively with Others

1. What is my goal in this conflict; e.g., what do I want from the conflict?
2. What is the goal of my partner? What do I believe my partner wants from the conflict?
3. What is my partner's professional role in comparison to mine? Are there details about our professional roles that should be taken into account in the ways we interact with each other?
4. How can we work to resolve this conflict so we will each reach our goals? If this is not possible, what is the next best method for resolving this conflict?
5. How can I initiate and maintain the conflict discussion in a way that sets the standard to honor both of our views?

Figure 6: Conflict Management: Pre-Activity Reflection Questions

As these examples taken from the data indicate, faculty wanted students to interact and work with others but if the assignment did not specifically indicate that expectation, students were reluctant to interact on their own. This expectation must be reinforced through specifically worded assignments that direct students to issues they must discuss with others and includes required outcomes of their discussions. Examples of specific discussion questions are offered in Figure 5. There may be other activity-specific questions the instructor would add to this list but when posed during the initial steps of an activity, these questions motivate students to consider their roles, the task, and create a plan to reconcile their roles in order to complete the task. Students can be directed to develop a solely or jointly written response to the questions prior to the activity, and/or write a reflection following the activity or use the contents of the reflection to contribute to class discussion following the activity.

Provide leadership in a variety of situations. In the food science program it was evident that faculty wanted students to acquire characteristics of leadership as evidenced by this professor's remark:

I was hoping they would be able to step back and look at how they interacted with different people in their group; if they would think 'this person was never very prepared and so I had to be the leader' but 'this person was really prepared and so I became the follower.' Those are the things that I would hope they would figure out but maybe they won't do that.

Rubrics for group activities contained items that implied leadership such as "Assess your own contributions to the activities. What did you do well?" "What is the level of responsibility in your team?" but these items are somewhat circuitous and students typically need more obvious instruction, challenge, and accountability measures in order to develop leadership skills.

Leadership is a topic with multiple definitions, theories, and concepts available in the literature. The Success Skills outcomes do not define the type of leadership or the context within which food science students would be called upon to be leaders; however, in classroom activities, leadership needs seemed most prevalent in group activities. Facilitative leadership (Schwarz, 1991) "helps the group to guide itself (p. 256)." During a classroom group activity, the facilitative leader guides members of a group to plan and execute the tasks necessary for the group to reach its goal. DeWine (2001) reminds that leadership is also about communication, that the leader has responsibility for maintaining civility and ensuring everyone has the opportunity to speak and the responsibility to listen and value others' contributions.

A method to encourage students to assume and develop leadership skills that hone their facilitative and communication responsibilities uses the group project check list in Figure 8. One student is designated who will start the group working through the checklist and encourage the contributions of each of the members in the discussion of each item. Leadership responsibilities can be rotated among group members throughout the discussion of the items on the checklist or, in the case of long term classroom or laboratory projects, a rotation schedule can be developed so the leadership role changes to other members at points throughout the activity.

Deal with individual and/or group conflict. None of the communication activities observed was dedicated to the practice of conflict skills, however in the contrived directional communication exercises, conflict became an inherent part of the interaction due to the differing perspectives of those within the interaction as a result of their respective power. The student approaching the CEO who proved to be unwilling to make the recommended changes in plant sanitation practices, the incoming shift manager who prioritized tasks differently than those indicated by the previous manager, and the new line person who has his or her own ideas about how to do the job, each was participating in conflict discussions, that is interactions between interdependent individuals whose goals differ. The power differentials of the participants added complexity, causing students to consider ways to initiate and process the conflict discussion in order to avoid causing professional damage. Although the conflicts found in the directional communication interactions were part of the contrived activities, faculty also reported the authentic conflicts that occurred in group activities. Group conflicts typically occur over misunderstanding or disagreement about members' roles or about the process used to meet the charge of the group, consistent with the types of conflicts the faculty described in the group activities in their classes. While the faculty expressed concern for the students involved in the

conflict, they were hesitant or uncertain about how to respond, the case with this individual: “I wish I’d done something about it but I don’t know...”

Conflict management is challenging under the best of circumstances, but as is the case with other communication skills addressed in this discussion, assignments can include guidance to help students plan for conflicts, participate constructively in them, and learn about their own responses to conflict in the relative safety of the classroom. Even in authentic circumstances, when time allows, it is advisable to know one’s desired goal and anticipate the other’s responses as well as other issues such as those found in Figure 6.

The last point in the planning process in Figure 6 asks students to consider how they can initiate and maintain a discussion climate where both parties’ views are honored. Students question how they can engage in conflict with a partner who insults them or uses similarly destructive communication practices or refuses to allow them equal time to speak or consider their conflict goal. There are several responses to this concern: first, they can state to their partner that using destructive communication practices do not facilitate working toward a conflict goal; second, a partner can prepare the other individual in advance for the conflict discussion: “I’d like to talk to you about something that I’m concerned about. Would you have some time tomorrow afternoon?” third, a partner can insist on conducting the conflict discussion according to ground rules such as “taking a time out when the discussion becomes heated;” and “refraining from personal attacks.” A conflict discussion follows a path that is similar to the problem solving process (See Figure 7.) Note that the process described works toward a “win-win” outcome, the mindset with which students should be encouraged to approach a conflict.

Conflict skills are often acquired by students through role plays but a more challenging modification of the role play asks students to switch roles with their partner and play the conflict

from the perspective of the partner. In addition to role playing, there are activities that focus on planning and reflecting on conflicts. In advance of a role play, students develop a planning document, using the topics designated in Figure 7 then evaluate the conflict on the basis of their planning. Some questions for reflection are: How was your planning helpful to the resolution of the conflict? What were areas you did not plan for that emerged and how will this information assist you in future conflicts? Will your professional relationship be strengthened, weakened, or stay the same as a result of the conflict? What have you learned about your own conflict skills? What have you learned about the conflict process?

Group conflicts often occur due to differing views of members' roles or opinions about group process, similar to the group conflicts that emerged from the data analysis. During group development, conflict, often called "the storming phase" is integral to achieving unity or cohesiveness, the rationale being that a constructive conflict enables members to achieve a more clear view of their own role in the group and the overall group goal. Group conflicts follow the process illustrated in Figure 6, but are best managed using a facilitator whose responsibilities include ensuring that everyone has an equal chance to present his or her views and everyone takes an equal responsibility to listen to others' views. The facilitator is also responsible for arranging for the conflict discussion by polling group members to identify a time and place convenient to everyone and developing a short list of ground rules and enforcing them. The facilitator maintains levity when the discussion becomes heated by paraphrasing what members say and asking for their confirmation before calling on others to speak, describing to the members the course their discussion is taking ("So far three individuals have made the same suggestions. Is there another viewpoint we could consider?"), and even scheduling breaks.

Know how to facilitate group projects & be a team member. The data show that most group assignments are those that required students to complete large, often complex tasks. Faculty justified group assignments as valuable practice for students “to organize what may seem to be an overwhelming project into something they [students] can do,” according to one faculty member. One example of such a project occurred in a food microbiology lab where groups were assigned to identify an interesting question related to food microbiology that they would gather data to answer. They were to conduct tests in the amount of four times the number of members in the group, but otherwise the way this large project was conducted was left to each group to decide. The instructor described the ambitious task designed by one of the groups in response to the assignment:

1. Each party discusses his/her perception of the conflict while the other party listens, asks questions for additional information, and paraphrases for clarity and understanding.
2. Each party identifies the goal he or she would like to attain from the conflict.
3. The parties discuss ways each could achieve his or her goal along with the strengths and weaknesses of each possibility.
4. The parties agree on a resolution that enables both parties to achieve their goal.
5. The parties schedule a follow-up meeting to discuss impact of the conflict discussion on their relationship and, if appropriate, to review the resolution – how is it working?

Figure 7: Conflict Management Process

1. ____ What is the charge for our group/team?
2. ____ What formal roles will be needed for us to execute our charge? What responsibilities do we expect from these individuals?
3. ____ What informal roles do we bring to this group/team? How will we deal with troublesome members?
4. ____ How will we manage our meetings and work times? What type of working culture do we want to develop? What ground rules are needed to help us achieve and sustain this culture? What are the documents that will help us work to meet our charge?
5. ____ What is the process we will follow to meet our charge? How will we make decisions as we follow the process?
6. ____ How will we resolve interpersonal conflict?

Figure 8: Group Project Checklist

It was a very interesting project. They were looking at ground beef from different grocery stores and whether the stuff that was fresh vs. had been sitting around for very long would keep longer. So they had three different grocery stores and they wanted to do three different sampling times, but then each sample they were going to store for different amounts of time and then they were going to run multiple biological assays on each of the samples. So they can get very creative. If they screw up, they have to repeat tests. That's usually when they'll say, 'I wish I knew then what I know now, and then I could go back.' Usually there isn't time.

The consequences of the project growing larger than the time to do it that the instructor described illustrates a typical predicament of a group whose members did not engage in advance planning or who added tasks incrementally as they worked through the project, causing the groups to lose control of their work. Consistent with observations of food science classes by Morgan and others (2006), the data suggests that group skills are not specifically taught in food science programs, rather students learn to work in groups by participating in group activities. Further, the communication of group members is fraught with challenges that increase exponentially due to the interactions of multiple participants compared to the challenges faced by two individuals interacting. In order to overcome the challenges inherent in groups and take advantage of the benefits of multiple perspectives, group members must have a clear, agreed upon process by which they approach their charge and they must have communication skills that contribute to the work of the group rather than disrupt it. An examination of programmatic documents and course syllabi indicates that group activities occurred in the curriculum more often than speaking assignments, but the activities and rubrics that accompanied them were not as specific or plentiful as for the presentations. Rubrics focused students toward self-reflections with items such as “To what extent do I feel a real part of this team?” and “What did you learn that you probably wouldn’t have learned on your own?” rather than containing explicit group proficiencies toward which students could be working.

In comparison to other communication activities, group work is convoluted due to the multiple perspectives of members. Added to that is the propensity for students working in groups to begin to work on a project without first discussing and planning their work. The result is hard feelings among members and assignment issues which, unfortunately, may not come to the attention of the instructor until the group is deeply conflicted. Boylston & Wang (2003) provide

guidance in ways to help students achieve success when working in groups. At a minimum instructors should require groups to engage in an initial planning session where members discuss the assignment, agree on their approach to the assignment, and delegate member responsibilities, with documentation of the outcome of these discussions. An initial planning session might have helped the group testing the hamburger samples to anticipate the tasks inherent in their assignment and more reasonably estimate the number of samples or tests they could run. Results of this initial planning session might also include a list of tasks to be completed within the assignment and a timeline for their completion, group member role assignments (clean-up, data collection, etc.), and ground rules (attendance policy, deadlines, etc.) as indicated in Figure 8. To ensure accountability, instructors may call for written updates from groups or meet on a regular basis with members. Harper and others (2003) and Boylston and Wang (2003) describe food science group laboratory projects that implement some of these suggestions. Harper and others found that student scores were improved on posttests following their group projects; students in Boylston and Wang's class exhibited "traits characteristic of an effective team" according to results of two assessments completed by the students.

Limitations

This study is limited in two ways. First, the small number of faculty participants.

Although the nine faculty participants are exceptionally well qualified to provide preparation in communication skills to their students, the results of this study should not be generalized to other food science programs. Second, although the data collected for this study was based on interviews with faculty, documents developed by faculty, and classroom observations, the perspectives of students were not included. Future research would include the voices of students.

Conclusions

The nine food science faculty who participated in this study and allowed the researcher into their classes are to be commended for designing activities that were both discipline specific and communication centered in addition to course expectations of the food science disciplinary content faculty were to address. Within this context, it is understandable that faculty did not explicitly provide instruction in communication skills. On the basis of the classes observed and results of interviews with faculty, the conclusion of this study is that exercises are necessary to direct students to communication skills practiced within the activities planning or reflective purposes yet demand minimal time and effort of the faculty. The present discussion has worked to meet those needs.

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Notes

¹ Edward T. Hall is a social anthropologist whose writings discuss the ways that nonverbal actions influence and are influenced by culture. Although his books were written forty or more years ago, they provide illumination about and basic insights into the nature of nonverbal actions and the power of those actions in human interaction. Some of his works are:

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Hall, E. 1969. *The hidden dimension*. Garden City, New York: Doubleday. 217 p.

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