Communication Across the Curriculum in Animal Science

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ABSTRACT: The growing movement toward the integration of communications in science-based courses has been taken to the heart of the curriculum at Berea College. New college-wide general education requirements initiated a review of student abilities, departmental expectations, and the use of writing and speaking skills in all courses. Agriculture graduates require highly developed reading and speaking skills as well as a fundamental control of language to succeed in industry today. Depending only on the English department to teach students writing and speaking skills can lead to graduates ill-prepared for communication in their chosen profession. The inclusion of communication skills in an animal science course not only improves such skills, but it also increases the ability of students to apply and use animal science concepts. The benefits of broadening the teaching curriculum to include reading, writing, speaking, and listening skills can provide improved academic achievement, attitude, confidence levels, and self-images. Students can become active participants rather than note-takers. Curriculum changes of such magnitude require faculty development opportunities and administrative support.

Key Words: Teaching, Communication, Curriculum, Writing

Introduction

The recent development of new guidelines for Berea College's required general education curriculum made it evident to the agriculture faculty that departmental offerings would have to be revised to include increased emphasis on the development and evaluation of reading, writing, speaking, and listening skills. After overcoming an initial impulse of "fight or flight," a lengthy process of justifying the educational feasibility of applying the college-wide directives within the agriculture curriculum and individual classes was initiated. The concept of reaching beyond the teaching of "agriculture" was not new to departmental faculty, because Berea College is a liberal arts institution. Although all of the agriculture faculty are the products of state land-grant institutions, the concept of a "liberal" education is a part of the program. The departmental philosophy recognizes the purpose of a liberal education as an opportunity to develop broad abilities and habits of mind. It involves connections, the setting of the fact in its context, the pulling together of disparate knowledge and understanding into larger, more integrative concepts. At its best, an education becomes "liberal" when a progressive and integrated approach is used; at the very least, it is what the students have left after they have forgotten everything they have learned.

Over the years, the Agriculture Department has focused on putting an agricultural emphasis on the liberal arts at Berea so that current agriculture courses fill many of the core requirements, including introductory courses to meet general education requirements for laboratory science courses. In addition, the department has stressed the importance of majors in such diverse fields as education, philosophy, or political science, knowing from where their food comes. It is felt that dietetics and nursing majors need an animal scientist's viewpoint on nutrition. The aim of education at Berea is a "liberal arts education with a reality reference." It was not a total surprise, therefore, when the college administration decreed communication requirements be developed for every major.

No one would agree that graduates from colleges of agriculture do not require highly developed reading and speaking skills as well as a fundamental control of language. But is it not the English Department's job to teach these skills? How can animal science faculty teach writing, listening, and speaking skills to our students in this age when information is exploding to such an extent that it is difficult to fit the necessary
scientific knowledge into a course or series of courses? The issue is not that students don't need to learn the factual, it is that they need to learn how to continue learning. The department decided to take a comprehensive look at what students really needed to learn.

Information Assessment

To begin this process, we placed the question within the liberal arts framework: what will students have left after they have forgotten what they have learned? What is so important to animal science that it must be covered in a course? As important as it is for our students to be exposed to the basics of modern animal production, economics, and food production, it is equally important for them to learn how to define problems, gain experience in assimilating relevant data, conceptualize and reorganize information to make deductions, and ask the hard questions for themselves. What is covered may not be nearly so important as the development of students' abilities to understand and critically think about what is presented in class. It must be recognized that one of the key differences between "covering" material and empowering students to "discover" knowledge on their own lies in the mastery of communication skills: writing, reading, listening, and speaking.

Historically, those of us outside the field of language and literature have left the development of these abilities to the English professors, often sadly shaking our heads about what students did not learn in Freshman Composition. But a realistic assessment acknowledges that in all technical fields, students should be taught how to use these generic communication skills within each discipline. Research has shown that communication skill achievement is a developmental process, and the establishment of good communication habits comes from practicing the skills regularly (Young and Fulwiler, 1986; Connolly, 1989) not in an isolated setting, but in several courses each term. As responsible partners in the endeavor of educating young people to assume leadership in the complex world into which they will graduate, it is important for faculty to accept the responsibility of providing developmental opportunities in agriculture courses and hope the remainder of campus does the same.

Student Needs and Expectations

Turning aside lingering doubts and skepticism, an evaluation of students' current status began with a departmental appraisal of the skill development of incoming students. This review uncovered several facts; most importantly, probably as a result of Berea's economic and geographic limitations to admission, many students were entering with low levels of communication skills. Armed with this information, a list of skill expectations that graduates must achieve was developed. Four levels of oral communication, one-to-one, small group discussion, teamwork, and formal oral addresses, were incorporated into the guidelines as follows:

1. Students will not be accepted as agriculture majors until completion of minimum expectations as evidenced by:
   a. Satisfactory completion of the freshman and sophomore level requirements in general education courses.
   b. Satisfactory evaluation of a communications portfolio as evidenced by the quantity and quality of preparation of submissions. This review is to be accomplished by their academic advisor.
   c. Completion of an admission to the major interview with a selected member of the department which evaluates the student's potential to handle the academic and communication requirements of an agriculture degree.

2. Students will not be approved for graduation until the following levels of communication skills have been achieved:
   a. Students must demonstrate the ability to participate effectively in a conversation with professional content.
      1) They must be able to converse in a language appropriate to the audience.
      2) They will have to demonstrate the ability to listen and understand the views of another in a one-to-one conversation.
   b. Before graduation, agriculture majors are expected to participate in small group professional-analytical discussions on a topic related to the discipline.
      1) This discussion characteristically involves outside investigation and preparation.
      2) The individual is expected to move the subject discussion forward in a professional setting.
   c. Students must be able to work as part of a team.
      1) They must be able to put together a unified effort as a result of teamwork, with each individual being a contributing member of that team.
      2) The team must be capable of developing measurable results. Skill building and evaluation of team work will be accomplished in specified courses and evaluated using a standardized form (Appendix A).

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3 Family of four limited to less than $34,000 annual income; students from the Appalachian region have preference.
d. Agriculture majors are expected to satisfactorily complete a formal scientific address of 20 min minimum.
1) The presentation will be evaluated by two or more faculty members.
2) Evaluation will be based on a standardized form (Appendix B). A minimum score of 70% is required.
e. Students must be able to write effectively on two levels:
1) Professional communication.
2) Layman's communication.
f. Opportunities for development and evaluation of specified communication skills will occur:
1) On an informal basis using standardized evaluation forms (Appendix C) in required classes throughout a student's college program. All completed evaluation forms are to be forwarded to the student's academic advisor.
2) Formally, through the review of the portfolio as well as in Ag 288, Research Literature and Ag 292, Senior Seminar.

Action Plan for Curricular Revision

With the assessment of beginning and ending skill levels established, class assignments in major courses were reviewed to evaluate their ability to provide skill practice and evaluation. It was encouraging to find that most departmental courses already included opportunities for communications development that simply needed fine-tuning. The major missing activity was the evaluation of assignments for evidence of communication skills in addition to proof of technical knowledge. Some of the ideas that were already in use or that were incorporated into existing courses are listed in Appendix D. Field study internships and independent study programs that require daily journals, formal papers, and forum presentations from participants (approximately 75% of majors complete at least one) were found to provide exceptional developmental and evaluative opportunities. Berea's required labor program also provided a developmental regimen for both oral and written communication in the context of agriculture. Other schools could use work-study or co-op programs similarly. Academic assignments were strengthened and coordinated by developing a standardized form for both formal and informal evaluation of students by all faculty. The completed forms (Appendixes A, B, and C) are submitted to the student's advisor at the end of the semester.

A course review also pointed out some weaknesses in the program that needed addressing. There was no class to introduce students to the broad world view of agriculture and their role in it. Additionally, it was found that our students needed training in leadership and time management skills. Student weaknesses in agriculture-based professional writing and research skills were found, and the curriculum lacked a course providing structure for reflecting upon and integrating the concepts introduced in professional courses. Through combining two required courses and dropping one requirement; an additional 1 1/2 courses, approximately eight semester hours of course time, were made available in students' curriculum plans. Two half-credit and one full-credit courses were developed to address these weak or missing components.

The full-credit course, titled Agriculture Literature and Communications, has been taught now for 3 yr. A junior level required course in professional writing, it provides opportunities for students to do brief literature reviews with oral presentation of the findings, thus helping them better understand and produce acceptable research literature in their field. Guest speakers are invited to present the results of their research using their own research articles as models, emphasizing the scientific basis of their writing and analyzing the articles' structures. In addition, students are required to produce resumes and cover letters, using the method of developing "life lines" tracing what they have done and projecting what they want to do in life. The course also includes a journal of personal writing, interview practice, and videotaping of oral presentations. It is, in essence, a short course in writing and speaking for professional success.

The effectiveness of the course has been assessed in a variety of ways. Student interviews, conducted by a departmental member and a member of the communications staff of the College (Shugars and Jones, 1992), and evaluation forms from each of the years have shown that the overall response to the course and writing assignments is positive. Among the data gathered were the observations that research assignments requiring on-line computer searching and in-depth library work were appreciated largely because the topics were selected by the students. Thus, they were more meaningful to them. Student response to personal journal writing has been the least positive. Probably because it was not graded, therefore, students wrote little outside of class. On the whole, students initially felt they were not good writers; however, they were able to see an improvement in their writing skills. Faculty evaluation of the course has found that short writing assignments emphasizing problem solving skills and providing revision opportunities are more successful than basing the hope of writing improvement on one major paper. Another helpful self-assessment for students was the assignment requiring the videotaping of oral presentations that allowed direct feedback to the students, as well as providing documented evidence of student accomplishment over time.

A half-credit course being implemented this year is Introduction to Global Agriculture. It is designed to
provide an overview of the international and political dimensions of agriculture and world food production.

Sections of it will emphasize leadership and time management skills, as well as initiating the demands of professional writing. Another half-credit (two semester hours) course, to be introduced in two years' time, is the capstone Senior Seminar. In this course, students will complete a basic research project, write a paper, and present the results in an open forum. Through changes in current courses and the addition of these new courses, there will be an integration of communication skills into the required curriculum of the department. The curriculum, as planned, will provide opportunities for initial and final evaluation of student communication abilities and skill building practice, while continuing as the source of technical knowledge which students can integrate and upon which they can reflect.

When all courses are in place, student oral presentations will be videotaped at least three times in the students' college career, providing the faculty ample opportunity to help students develop oral communications skills and producing review material for students needing remedial assistance from other departments. A new College-required student communications portfolio into which entries are added every semester also provides a continuing opportunity for students, advisors, and faculty to review a student's progress in the basic skills.

Faculty Development

Integration of communication skills and knowledge has had many beneficial effects in the teaching of fundamental agricultural knowledge. The faculty have found that it is not necessary to stress formal writing concepts such as style, grammar, and structure in all assignments (Connolly, 1989). Informal writing exercises not only give students skill practice, but also improve faculty teaching skills. Exercises that require written reflection encourage each student to identify her or his problem areas, enhancing the quality of the student's understanding of the material and the professor's knowledge of what the student has actually learned (Palmer, 1985). Verbalization requires the learner to report on the thinking process during problem solving, thereby providing the teacher an opportunity to find at what point problems and difficulties occur as well as giving students the chance to "own" the material by transforming it into their own language. Four semesters of experience with communications integration have shown that increased use of writing and speaking in a technical course such as Introduction to Animal Science enhances the level of conceptual learning. It is not merely an extra assignment appended to course material.

Benefits are not always in the form of increased academic achievement. Instead, they may also be found in changes in attitudes, confidence levels, and self-image. Students given the opportunity to become active participants in their own education are different from those who simply take notes as faculty "cover the material" from podiums. Students have demonstrated active learning by questioning and participating in discussions, stopping the lecture to reinforce key points, and relating lecture material to previously read text, all characteristics observed in students actively involved in the process.

Students can be positively or negatively motivated by the instructor's level of enthusiasm. Not all teachers will be successful in the integration of communication skills into the classroom. Faculty resistance still occurs. One must be committed to motivate the class to adopt this learning process. The support of college administrators, members of the English Department and student communication centers are important in the integration of communication skills into the curriculum. Release time for curriculum development, reference material, and mentoring are all important support principles. The results at Berea have shown the change possible when faculty across disciplines come together to share and extend their approaches between subjects.

These changes are not stress-free. They require curricular support for the faculty. Yet, human progress in understanding the world has always been rooted in the qualities that good teaching can foster: initiative and curiosity and the willingness to work through difficulties in order to make sense of the situation. It is important that faculty learn to apply teaching skills outside of their own areas of expertise.

Nowhere is this more true than for those in the field of animal science. No longer should our subject be viewed in an isolated or insular fashion, if indeed it has ever been possible to do so. The growing importance of international, political, and ethical dimensions of our discipline must increasingly be recognized. Students who have not learned the global implications of their discipline have by definition been too narrowly trained. A professional education requires a knowledge of the liberal arts to be complete. This complete education enables students to make an effective whole out of disparate knowledge. Communication in these dimensions is a requirement for animal scientists of the future. The animal science faculty member's role is to produce agriculture graduates who will take their place in society as literate, creative, productive, and responsible individuals and citizens. It is our role to teach agriculture students more than just the technical aspects, if for no better reason than to prepare them for the jobs that they will seek upon graduation. While employee technical knowledge is important to industry's success, agricultural research (Litzenberg and Schneider, 1989) has shown that companies search out people who can communicate,
who have a positive attitude, are motivated, and have a strong leadership and work ethic.

Implications

Preparation of future animal scientists requires that teachers do more than present technical material. Curriculum plans should include opportunities for the development of reading, listening, writing, and speaking skills. Benefits of retrofitting animal science courses to include these skills can go beyond improved communication abilities to encompass improved retention of technical material, confidence levels, and self-esteem.

Appendix A. Team Behavior Appraisal

The participation rating scale ranks your performance on the criteria found below:
4 = Outstanding: Consistently exceeds what is expected.
3 = Above average: Frequently exceeds what is expected.
2 = Average: Consistently achieves what is expected.
1 = Below average: Occasionally fails to achieve what is expected.
0 = Unacceptable: Consistently fails to achieve what is expected.

Name ________________ Class ________________ Date ________________

Leadership Support (behavior that enhances feelings of self worth, influence and importance)

Team Facilitation (encourages members of team to develop close, mutually satisfying work relationships)

Work Facilitation (help achieve goal attainment by doing things such as scheduling, coordinating, planning, and providing resources such as tools, materials, and technical advice and knowledge)

Goal Emphasis (stimulates enthusiasm for meeting the teams’ goals, helps establish priorities, and promotes achievement of excellence)

Upward Influence (advances the status of the group by acquiring needed resources, eliminating barriers)

Raw Score __________

Remarks

Literature Cited

### Appendix B. Formal Oral Communication Evaluation

<table>
<thead>
<tr>
<th>STUDENT</th>
<th>EVALUATOR</th>
<th>EVENT DATE</th>
<th>ADVISOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content of speech</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Suitability of the material used, accuracy of the statements made, Evidence of purpose</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Composition of speech</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Organization of content, unity of thought, logical development</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Language usage, Sentence structure</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Accomplishment of purpose</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Conclusions</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td><strong>Voice</strong></td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Quality, pitch, force, articulation, pronunciation</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td><strong>Stage presence</strong></td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Personal appearance, poise and posture, ease, attitude and confidence</td>
<td></td>
<td>0 2 4 6 8 10</td>
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<tr>
<td><strong>Use of Visual Aids</strong></td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
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<tr>
<td><strong>Power of expression</strong></td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Fluency, emphasis, directness, sincerity, communicativeness, conveyance of thought/meaning</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>Extent to which speech was interesting, understandable, convincing, pleasing, and held attention</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td><strong>Handling of questions</strong></td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
<tr>
<td>OVERALL</td>
<td></td>
<td>0 2 4 6 8 10</td>
<td></td>
</tr>
</tbody>
</table>

Speech must be repeated until overall score is 70%

### Appendix C. Informal Oral Communication Assessment Form

<table>
<thead>
<tr>
<th>Student</th>
<th>Evaluator</th>
<th>Advisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event</td>
<td>Date</td>
<td>Excellent</td>
</tr>
<tr>
<td>Competencies:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to present an opinion persuasively</td>
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<tr>
<td>Ability to contribute to classroom discussions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to engage in discussion as both speaker and listener; interpreting, analyzing, and summarizing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to frame concepts and feelings in the language of the medium and present them in a developed manner for the audience</td>
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<td></td>
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<tr>
<td>Ability to vary the use of spoken language to suit different audience</td>
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<td></td>
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<tr>
<td>Ability to answer and ask questions coherently and concisely, and to follow spoken and written instructions</td>
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<td></td>
</tr>
<tr>
<td>Ability to engage critically and constructively in the exchange of ideas, particularly during class discussions and critique sessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note taking abilities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Appendix D. Simple Ideas for Incorporating Communication Skills into the Classroom

1) At the beginning of the class, ask what is the most important thing in the reading assignment. Alternatively, stop the class with a couple of minutes to go, pass out half-sheets of paper, ask the students to answer the question: What is the most important thing you learned today? This exercise will help the instructor understand the students' feelings, questions, and confusions with the learning process. Class discussions can begin by the instructor asking a question and having the students write notes for an answer before the discussion starts. This allows them to organize their thoughts and provides for more meaningful class discussion.

2) To get students involved in the course material as thinkers and writers instead of just as listeners and readers, ask them to work in teams in class to develop an exam with each team developing a specific list of
factual, concept, and synthesis questions. Students show more evidence of comprehending the material when using this method.

3) Require all tests, quizzes, memos, and reports to be in complete sentences and require more “short paragraph” responses rather than merely one-line answers.

4) To stimulate active listening, outline three or four main points of the day’s lessons on the chalkboard. Ask students to copy the main points, leaving space between them. As the class unfolds, have them fill in the supporting details for each main point.

5) Always require questions to be answered in writing for each reading assignment.

6) Instructors can make assignments more realistic and use them to teach the forms of writing that students will use as professionals in agriculture by specifying the audience and purpose of the writing. One effective method is to require students to write two versions of the same answer to two audiences. For example, one to a 10-yr old and the other to a producer.

7) Shift the emphasis from assigning a grade to teaching the writer-speaker to improve the response. This can be accomplished by using check sheet responses rather than strict letter grades.

8) In introductory courses, time is well spent teaching students how to read and take notes from a science and fact-based text book. Use of journals and reading logs, as well as “double entry” note taking techniques can be valuable.

9) Assign more frequent and shorter papers (i.e., three or four short documented essays rather than a semester-long research paper). Student evaluations and personal experience have shown that short frequent assignments with specific purposes and with credit given for subsequent revisions are more worthwhile than single lengthy papers for improving writing skills.

10) One worthwhile assignment for teaching students how to see and create relationships and linkages requires that the instructor makes a list of 5 to 10 words that are generally related. This list is then used for several connected assignments that require connections and utilizing additional material. An example might be:

   a) write a focused, thematic essay of one paragraph utilizing all the words in the following list:

<table>
<thead>
<tr>
<th>breeds</th>
<th>muscle thickness</th>
<th>variability</th>
</tr>
</thead>
<tbody>
<tr>
<td>frame score</td>
<td>carcass size</td>
<td>consistency</td>
</tr>
<tr>
<td>yield grade</td>
<td>consumer needs</td>
<td>dressing percentage</td>
</tr>
<tr>
<td>marbling</td>
<td>value based</td>
<td></td>
</tr>
</tbody>
</table>

   b) After the paragraph is written, find two additional facts from the assigned reading and rewrite the paragraph to include the new facts.

c) Develop and ask one question that is raised by your paragraph.

d) Make an answer to the question the topic sentence of another paragraph.

e) Go back to your original paragraph and summarize it into one sentence.

11) Consider using debate in the classroom. In addition to providing opportunities for oral presentation, debating provides opportunities to foster and evaluate organizational skills, stimulates critical thinking and listening abilities, and offers students greater information on specific technical areas. Debate topics should be assigned by the instructor. Students are allowed 10 min to present why a proposition is true or false. Each team is expected to come prepared with questions and responses to the opposing arguments, and the entire class is expected to ask questions.

12) Requiring informal double entry journals provides several opportunities to monitor the development of students and provides a method of demonstrating their range of competence. Textbook and lecture notes go on the right-hand page. The left-hand page is reserved for questions and connecting lecture with the reading material. Some examples of questions students should be answering on the left side include: What were the important points introduced in today’s lesson? What did I (conversely, did I not) comprehend? What questions would I like to ask?

13) One assignment is to have students write the author of the textbook a critique of one of the chapters. In this letter they should tell the author what they found confusing and how it could be improved.

14) Have students write the most important or difficult concept studied so far and why they felt it was important or difficult.