

Marketing Meets Microbiology: An Interdisciplinary Approach to Liberal Arts Education

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To address the recent calls for integration between liberal arts education and the business curriculum, we designed the team-taught interdisciplinary course *How to Cell: Marketing Meets Microbiology*. The course blended multiple introductory courses, focused on environmental issues involving microbiology, and addressed how they were being “marketed” to the public. It introduced students from business, science, and other majors to presumably unrelated topics. Our main objective was to help students gain a greater sense of awareness about the roles of business and science in environmental management activities.

Liberal arts universities with business colleges are faced with finding ways to integrate liberal arts education into the professional curricula to help professional program students enhance their broad-based education (Skinner & Lawson, 2006). The need for a more ingrained approach to blending the domains has been made clear via organizations such as the Association to Advance Collegiate Schools of Business (AACSB) and the Association of American Colleges and Universities (AAC&U). According to AACSB, business students need a well-rounded education in order to contribute to organizations and society as a whole. AAC&U (2003) asserts that professional studies, such as business, should be approached from a liberal education standpoint. In a liberal arts school, the business college is faced with the challenge of designing curricula to increase the relevance of arts and sciences to business students (Chew & McInnis-Bowers, 2004; Hawes & Foley, 2006; Hill, 1990). While business students understand the value of a liberal arts education, there is a disconnect between this understanding and the business-world applications of the information.

Many students, particularly business students, cannot link what they learn in the university core curriculum with the courses in their major area of study. They are often overzealous to get these core courses “out of the way” and thus miss their relevance to business education. In a study by Skinner and Lawson (2006), a class of graduating marketing students was asked: “What does it mean to have a liberal arts education?” One of the most common responses was, “To have a more rounded education.” However, when asked later in the semester about changes they would recommend, these same students said things like, “I suggest that business students not be forced to take certain core (liberal arts) courses. For example, I find no reason students need to take physics or nonbusiness related courses.” This perceived disconnection between the core tenets of a liberal arts education and their real-life applications at the undergraduate level can

ultimately deprive students of the unique skills that such an education provides. Thus, integrating liberal arts education within the business curriculum has become an important goal for business school educators (McCabe & Grant, 2007; Warren, 1992; Wilson, 1998).

To address the call for increased blending between a liberal arts education and the business curriculum, we designed an interdisciplinary course that is team-taught by a marketing professor and a microbiology professor. The course, *How to Cell: Marketing Meets Microbiology* (see Appendix A), examined the impact and overall effect marketing has on microbes in health, business, and environmental contexts. The purpose of this course was to integrate the liberal arts concept with seemingly unrelated disciplines across campus through a blending of several introductory courses. The focus of the course was on environmental issues involving microbiology and addressed how they were being “marketed” to the public. It introduced business (e.g., marketing and finance), science (e.g., biology and chemistry), and other majors (e.g., mass communications and environmental studies) to presumably unrelated topics. This class brought together students from several disciplines and helped them understand and see the relevance and value of each discipline.

The course was designed to give students the opportunity to apply learned marketing principles to specific and broad-range environmental issues. It also examined the impact of marketing on the public perception of microbes in health, business, and environmental contexts. We wanted students to improve their critical thinking skills and go beyond their traditional disciplines to become more adept at integrating ideas across academic concepts (Warren, 1992). To increase enrollment and discipline diversity within the class, the course was cross-listed across business, biology, and environmental studies. Additionally, it was listed as an Honors-level course through the Honors Program and included both Honors and non-Honors students.

This article is organized into four sections. The first section describes what we wanted students to gain upon completion of the course, including challenges and opportunities this course addresses. The second section outlines innovations used to successfully implement the course, including the process used to deliver information and student learning assessment measures. The third section reviews assessment results, including anonymous course evaluations and comments from students in their submitted reflection pieces. The final section presents potential challenges and concerns in implementing this type of interdisciplinary approach at other universities and provides recommendations for doing so.

Challenges and Opportunities the Course Addresses

Business and Environmental Concerns

Recently, businesses have used environmental issues and awareness to a strategic advantage. Marketing practitioners had expressed concern that business schools were lagging behind the level of environmental awareness in the corporate world (Ahna & Bancroft, 1992; Barnes & Ferry, 1992). However, marketing strategies can greatly enhance scientific communication to foster collaborations and information that is shared with the public. In response, the AACSB called for business schools to develop students' knowledge and abilities to address such issues.

Many students with majors in scientific disciplines (e.g., biology, geology, and chemistry) and an interest in environmental studies have little familiarity with marketing strategy (Weise & Sherman, 2011). Like numerous consumers, they see marketing as part of the consumption and waste problem rather than as an opportunity for solutions. In addition, business students, particularly marketing majors, can benefit from increased awareness of socially responsible advertising and promotion (Burnett, Keith, & Pettijohn, 2003; Drumwright & Murphy, 2009; Preston, 2010). According to the AAC&U, there is a need for a purposeful integration of business education and the humanities, with a focus on more interdisciplinary approaches in the training of business school students (Chew & McInnis-Bowers, 2004; Hawes & Foley, 2006).

Applying the concepts within a liberal arts education, interdisciplinary learning brings together perspectives and knowledge from different disciplines to approach a problem in a more integrative, comprehensive way. It allows students to approach and solve multifaceted issues through the incorporation and application of knowledge from different disciplines (DeZure, 1998-1999). With this in mind, *How to Cell* was designed to accomplish two goals: (1) to show marketing students how to use environmental integrity as a competitive strategic point of difference in the real

world; and (2) to introduce responsible marketing techniques to non-business majors and show how marketing is used in scientific fields.

What We Wanted Students to Gain Upon Completion

The first objective was to help students gain a greater sense of awareness about the roles of business and science in environmental management activities. Second, we wanted to provide students with an ability to think about pressing issues and possible solutions within their own fields by drawing on contexts from other disciplines. Finally, we wanted students to develop valuable skills desired by employers: problem solving, higher-order critical thinking, research and analysis skills, teamwork, and communication.

Outline of the How to Cell Course

The course included three instructional units that reflect key issues raised or avoided within current media. The three units focused on (1) "viral" marketing; (2) food, contamination, and public perception; and (3) marketing, microbiology, and the environment (see Appendix B). Using the recommendations of Hyllegard, Ogle, Rudd, Littrell, and Bickle (2012), each course unit comprised a variety of multisensory instructional tools designed to engage students in learning key scientific concepts and responsible marketing. At least one class period was devoted to examining each topic from the perspective of each discipline. We encouraged group participation and in-class discussions, and both professors posed questions during the lectures in order to weave the disciplines together.

According to Abson (1994), team-based learning enhances cognitive advancement, critical thinking, and the ability to work with others. Learning orientation literature promotes the use of an organization-style environment to stimulate more collaboration, commitment, and community in a class. According to a recent analysis of business job postings, the top four most-cited skills sought after are oral communication (83%), written communication (75.4%), presentation (71.8%), and team/relational/leadership (66%) (Schlee & Harich, 2010). All of these skills are utilized and honed in a learning orientation context.

A learning orientation is defined as the concern for, and dedication to, developing one's competence (Dweck & Leggett, 1988). For a learning orientation, classroom focus shifts from teacher to student (Gonzalez, Ingram, LaForge, & Leigh, 2004; Tanner & Roberts, 1996). Components that allow a learning orientation to develop in a class include a sense of commitment to learning, shared group vision, and open-

mindedness among the students (Laverie, Madhavaram, & McDonald, 2008). To accomplish these aspects, we utilized both individual and group assignments to measure student learning. The co-professors assembled four student groups that included a mixture of students from different majors. Two of these groups solely consisted of Honors students who completed an additional assignment described later in this manuscript. Students stayed in the same groups for the entire semester to facilitate problem solving, work division, and long-term collaboration. The benefit of the liberal arts and science context of the assignments was evaluated indirectly through class discussions and student evaluations.

Student Learning Assignments and Assessment Measures

Each unit plan had activities involving individual participation in online discussion topics and group project presentations in class. The co-professors covered a specific unit (e.g., “Viral Marketing”), students completed an online discussion topic, then student groups presented on a related topic of their choice, making sure to evaluate the three discipline pillars of the course: marketing, microbiology, and the environment.

Experiential learning is a process that allows students to apply concepts and theories to real-life situations to establish connections between what they have learned and what they have observed and experienced (Kolb, 1984). Our goal was to have students demonstrate knowledge of the subject matter, as opposed to regurgitating information they gathered (e.g., Peterson, 2001). To increase the educational relevancy of the topics, we pulled headlines from current events and used them as the basis for individual discussion topics (see appendix C). In the sample discussion topic found in appendix C, students were assigned the roles of public relations ambassadors. In order to write a quality press release, they needed to research the topic (tuberculosis) and include facts regarding why it was important to receive a preventative vaccine.

How to Cell strongly utilized active learning to make students the center of their own learning processes (Warren, 1997). Crittenden, Crittenden, and Hawes (1999) propose the use of teams to improve case-based learning as an effective method for facilitating active learning. Team-based active learning mirrors the workplace (Livingstone & Lynch, 2002) and allows students to develop skills that are relevant and valuable (Schlee & Harich, 2010). The previously-described student groups were utilized with goals of showing students how to improve critical thinking; manage their time; practice interpersonal, listening and

speaking skills; and become better writers (e.g., Jacobsen, 1995; Warren, 1997).

Individual and group unit activities allowed students to explore and analyze varied stakeholder attitudes related to environmental marketing and engaged them in higher-order thinking skills, thus encouraging critical reflection across several disciplines (Bonwell & Eison, 1991). Specifically, the unit activities provided students with the opportunity to demonstrate knowledge of (1) the decisions and activities involved in the development of environmental communications, (2) the potential for positive and negative societal consequences of these communications, and (3) the ability of consumers to respond to these communications.

If an instructor’s standards are high, students will generally rise to meet those standards (Cross, 1987; Peterson, 2001). To clearly define our expectations and measure student comprehension of subject matter, grading rubrics were provided to the students (see appendix D). In addition, specific explanations of what was expected for each assignment were provided. For example, the description of group presentations in the syllabus read as follows: “A 15-minute group presentation will be due at the completion of each unit. Presentations will be evaluated based on content and ability to answer the question or topic. The assignment must include environmental, microbiological, and marketing aspects.”

In addition to the regular group projects, Honors Program students were tasked with an extra assignment to fulfill the Honors Program course requirements. According to Professor Seung Hwuan (Mark) Lee of Ryerson University, creating video documentaries provides students with an opportunity to express their work in a different way (Whalen & Coker, 2016). Thus, in lieu of a final exam, Honors Program students completed a “mini-documentary” (between 5-8 minutes) highlighting an environmental issue dealing with a microbiology/marketing topic of their choice that was not addressed in the course (e.g., the cause of the declining bee population and its lack of media coverage). Non-Honors students watched the documentaries and provided feedback on documentary content and clarity (see appendix D-3).

Student reviews were also a major component of assessment. After each group presentation, students provided two sets of reviews (see appendix E). First, students reviewed the group presentations using a rubric similar to the one provided by the co-professors for grading guidelines. They had to evaluate all presentations, including their own. The co-professors tallied the scores and comments, and a blind review was provided to each group. Second, students had to submit peer evaluations for their individual group. Students not only assessed their peers, but also themselves as group

members. These were used to both reduce the “free rider” effect of groups (Abernethy & Lett, 2005; Brooks & Ammos, 2003) and offer an opportunity for self-reflection. Reviews were requested for each member's attendance of group meetings, degree of respect towards members, willingness to cooperate and be supportive, quality of contributed work, and perceived contribution to overall group performance. Following the guidelines of Razzouk, Seitz, and Rizkallah (2003), the composite scores were then used in computing the team member's grade on group activities. Thus, even if a group presentation earned an "A" grade from class evaluations, the grade for each team member could be different based on the peer evaluation composite scores.

Assessment Results

Course evaluations at the end of the semester were extremely positive. More than 93% of the students thought the class was organized, engaging, and well-presented. However, the most telling information came from student reflective essays.

The first week of class, we asked students to submit an opening reflective essay (see appendix F). In this, we asked what they hoped to gain out of the blended liberal arts course and whether there were specific topics listed (or not listed) on the syllabus they were interested in or wanted to learn more about. Although we were willing to incorporate missing elements into our plans, we found that an overwhelming majority of the students were pleased with the syllabus, wanted greater explanation on topics we were already planning to discuss, or were just simply excited to see how the disciplines merged:

Solely based on all of the information that I have gathered so far on this course, I am very eager to be a participant in this subject. As a marketing major ... I have to admit that I never would have considered the cross relations that could occur between two very different subjects like marketing and microbiology ...the plausibility of this connection seems much more realistic now.

Similarly, we required a closing reflective essay (see appendix F). The week of final presentations, we asked students to reflect on the team-taught, interdisciplinary course and tell what they viewed as the most interesting/best part of the course. One marketing student noted how the course helped him better appreciate biology:

My most positive experience in this class had to be the connections that the biological information presented to us had with marketing concepts. This added another dimension to my understanding of

marketing as well as expanded my knowledge of biology ...and gave me a newfound appreciation of biological concepts.

It became clear how much the non-business majors learned about marketing, specifically the interpersonal and research skills needed to effectively market a product or campaign. One chemistry major wrote about how marketing will help her in her career as a veterinarian:

My most positive experience ... was getting a new perspective on marketing. I have previously always thought of a salesman when I [thought] of marketing ...I thoroughly enjoyed learning that there is much more to marketing than just [sales]. I learned that marketing also deals with public relations, informing the public, and much more. I now see how marketing can be used in a positive light ...such as the marketing of potentially catastrophic diseases that can affect humans, plants, or the environment...I have also learned some marketing techniques which will also be extremely useful in my career as a veterinarian.”

An environmental studies major noted:

... I was able to accomplish my goal of conjoining my passions through this course by gaining knowledge about marketing and how it can be applied to the scientific sphere, as well as a better understanding of scientific concepts and their place in society. I really appreciated the process of research and presentation which we took in our group projects, so that we not only learned more about subjects touched upon in class, but were given the opportunity to share that information with our peers, while simultaneously practicing our public speaking and marketing skills.

Based on the student feedback in both the anonymous reviews as well as the closing reflective essays, we were confident that we had blended marketing, microbiology, and environmental studies, developing a course immersed in the basis of a liberal arts education.

Challenges and Concerns

There are challenges to effectively bridging the divide between liberal arts and business, and a course that blends marketing and microbiology in an environmental studies context that is then delivered through team teaching is not exempt from these challenges. As with any project, there are some challenges and concerns that arise from a student perspective, a professor perspective, and a university perspective. In the opening reflective essays, many

students expressed concerns regarding whether the co-professors would have strife during class. Each professor was motivated to learn and recognized the value of the team-taught course for the students. We met several times the semester before the course began and worked together to develop the syllabus. To manage weekly issues, we ran questions or concerns by each other before and after class and via email, as needed. We were also engaged in each other's lectures, asking questions and offering additional insights to the presentations. In turn, we were able to minimize in-class challenges and disruptions.

From a professor perspective, the amount of time and energy required of the teaching team to develop the course was a challenge. Determining the most effective, interesting ways to blend these disciplines and developing engaging course topics and activities required several months of collaboration. We held off-campus meetings at a local coffee shop to discuss the course, which reduced on-campus distractions like student visits, emails, and other faculty interruptions. Managing learning assessments also raised some challenges. Grading assignments and providing timely student feedback are time consuming activities when teaching a course by oneself. With team teaching, one might think these efforts are diminished, but in actuality, they are doubled. We decided the most effective grading strategy was to have both professors evaluate each assignment and then discuss a final grade. While we both provided grades and feedback on assignments, we rotated the responsibility of being the first to grade the assignment.

From a liberal arts university perspective, the concept of an interdisciplinary course is easily adaptable across multiple disciplines; however, securing interest in the course may prove challenging. We addressed this challenge by cross-listing the course as an upper-level elective across multiple disciplines: marketing, biology, environmental studies, and Honors. Depending on the course level, the complexity of the issue being addressed can change. Similarly, graduate-level courses can grow in complexity. Due to our university's small student body (approximately 3,000 undergraduates), we focused on promoting the course to upper-level students, particularly focusing on the Honors Program. There were sixteen students enrolled in the class. From a course discipline standpoint, 10% of all marketing majors and 4.7% of all biology majors on the campus were enrolled in the class.

Considering that class enrollments are often much larger than sixteen, there are several techniques that can be used to scale up the class for larger enrollment numbers. For example, open-ended classroom discussion questions can replace online discussion questions. These questions can be used to start and finish the class (Bonwell & Eison, 1991). Short

durations of discussion facilitate student participation and engage students in active learning. This helps shift the learning process to be student-controlled. To ensure class participation, the use of small random groups can be used. Small groups create an environment where students can work through their ideas with their peers before sharing their ideas in a large class.

Similarly, student-led question and answer sessions are also beneficial. Students develop open-ended questions from the readings and pose these questions to their peers. Here, students can draw from current trends and issues in the news and make direct comparisons with the assigned readings. This technique can also help build rapport and allows more control for the students to actively adapt material to their own unique learning preferences (Kolb, 1984).

Use of technology in the classroom allows professors to gauge participation levels. For example, incorporating clicker-response testing provides real-time responses. Clickers can be used to take attendance, as a check for understanding basic concepts, or as a mechanism to encourage higher-order thinking and student discussion (Wood, 2004).

Conclusion

There is strong evidence that interdisciplinary, experiential learning benefits liberal arts students (Eyler & Giles, 1999; Markus, Howard, & King, 1993; Wiese & Sherman, 2011). There is still a need to blend business and liberal arts education in a way that effectively brings together the learning goals and objectives from both domains (Chew, McInnis-Bowers, Cleveland & Drewry, 1996). This course provided students with a unique opportunity to combine different passions and see how diverse fields work together to accomplish common goals, such as reducing food waste, sharing information about infectious disease with the public, and effective communication across disciplines. The students learned new concepts regarding each discipline, saw how each of these concepts blended together for a common cause, and developed their own blended concepts for the group presentations. Students also gained a better understanding of the increasing importance of environmental concerns as a critical societal trend and of how marketing can help the cause.

Findings from both the student learning assessments and student reflective essays provide evidence that students increased the depth and breadth of their knowledge relative to environmental marketing, as well as their personal and professional commitment to ethical decision-making. Based on students' performances, positive feedback, and teaching evaluations, this innovative course was considered a success by the students; by the professors; and by the marketing, biology, and environmental studies programs.

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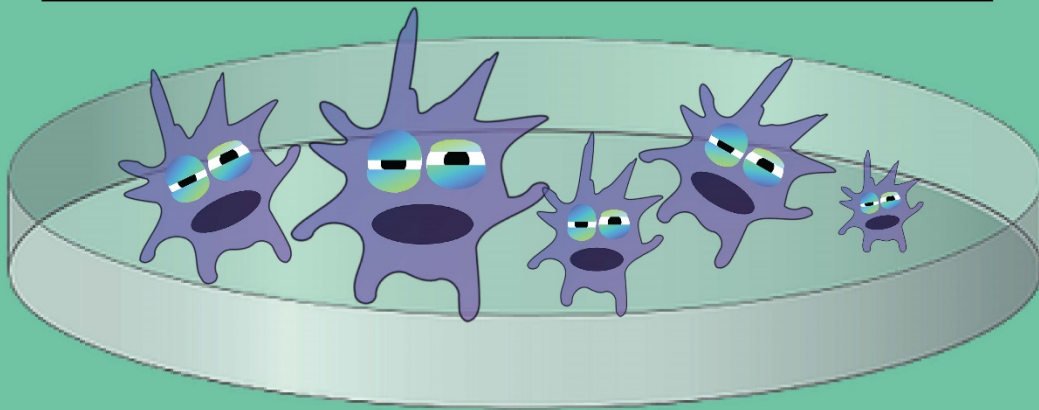
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Appendix A
Class Promotional Piece

Let's Get
—CULTURED—



How to Cell

Marketing meets Microbiology

This is a team-taught, interdisciplinary course focused on environmental issues involving marketing and microbiology. We will examine the impact marketing has on microbial topics such as health, food, and the environment.

MK455 BIO405 HNR309 ES300

MW 2-3:15, CRN 11275

Appendix B
Class Outline

UNIT ONE: “Viral” Marketing — Students will become familiar with both the beneficial and detrimental contributions of microbes to human health. Students will also learn details about specific organisms and how marketing (with additional emphasis on public relations) has changed and/or influenced current societal perceptions and attitudes about microbes.

Topic
Course Introduction; <i>Online Opening Reflections Essay</i>
Ebola
Pharmaceutical Taboo Topics
Pharmaceutical Antimicrobials
Germophobia
<i>Online Discussion Topic 1</i>
<i>Group Presentations</i>
<i>Online Peer Evaluations</i>

UNIT TWO: Food, Contamination, and Public Perception — Students will learn about the impacts of food contamination and the role marketing (with additional emphasis on advertising) plays in determining the types and amounts of foods we purchase; special attention will be placed on agricultural crops impacted by microbes and the public perception of what is “safe” to eat.

Topic
Sell By/Best Buy Date Labels
Grapefruit/Citrus
Corn Smut
<i>Online Discussion Topic 2</i>
<i>Group Presentations</i>
<i>Online Peer Evaluations</i>

UNIT THREE: Marketing, Microbiology, and Environment — Students will appreciate the contributions of microbes to the environment and the impact of marketing on public perception of environmental issues, including infectious diseases.

Topic
Black Plague
BP Oil Spill
Marketing: BP Oil Spill
MOVIE: <i>Contagion</i> (relating to first class topic)
<i>Online Discussion Topic 3</i>
<i>Presentations</i>
<i>Online Peer Evaluations</i>
<i>Online Closing Reflection</i>

Appendix C
Discussion Topic Example

REMEMBER: Provide at least one outside source to support your statements (not the ones listed in this article); this can either be in your PR piece or in your justification of recommendations.

Tensions are high in Perry County, AL, due to the recent Tuberculosis outbreak. In fact, according to *AL.com*, local health officials are offering incentives of up to \$160 to encourage residents to get tested and treated. However, even with these incentives, health officials are still unable to gain the trust of the community, making it difficult to trace the outbreak point of origin.

Imagine you are appointed as the Public Relations (PR) manager to mitigate the outbreak and promote the \$160 cash 'special.' *First*, read the following scenario. *Second*, read each question and its subcomponents. *Third*, answer each of the following questions; be sure to completely answer **all three parts for each question**.

1A. Write a news release (either a newspaper article or TV news broadcast segment) or commercial (like the pharmaceutical ads) to encourage residents to participate.

- In your answer, state which PR piece you are writing (ARTICLE, BROADCAST, or COMMERCIAL) as the header.
- Write the PR piece exactly how the individual would read it/see it (so for the broadcast, write it how the newscaster would read it; for the commercial, describe what the viewer would be seeing).

1B. Why did you choose this as your method to share the information?

1C. How did you address the issue of government mistrust within the community? Why do you think this will convince the population to be more forthcoming with information?

Things to keep in mind when writing your PR piece:

- Who is the piece *targeted* toward? Teens? Young adults? Elderly? Families?
- Is the piece written to motivate the person through *fear* (of death), *urgency* (offer ends soon), or some other emotion? Is it written to disarm the individual and 'lighten the mood' (e.g., Viagra commercials)?
- *Because time/space in ads is limited*, what facts do you want the audience to hear/remember? What is the proper blending of TB science (dangers/facts/figures) with the monetary incentives?

2A. Respond to at least **two** posts. What is your reaction to the piece? For example, does it cause you to act immediately, seek out more information, or something else?

2B. Who do you think the piece is targeting? What makes you think this?

2C. Give at least two recommendations on how the piece could be strengthened (or if necessary, softened).

Appendix D-1
Group Presentation Grading Rubric

Criteria	4	3	2	1
Introduction	Introduced topic & explained the purpose of presentation in creative, clear way, capturing attention.	Introduced presentation in clear way.	Started with a self-introduction or “Our topic is” before capturing attention.	Did not clearly introduce purpose of presentation.
Content Selection: <i>Microbial, Marketing</i>	All information was relevant & appropriate to requirements of the assignment.	Most information relevant; some topics needed expansion or shortened.	Information was valid but some was not explicitly related to the purpose.	Information not relevant to the audience or directly related to assignment.
Organization	Contains clear central message & clearly-identifiable sections featuring organizational pattern (chronological, problem-solution, analysis, etc.)	Central message is identifiable; sections vary in organizational pattern, which influences audience engagement level or comprehension of central message.	Central message is not clearly and/or easily identifiable by audience; sections may be in need of further organization & clarity.	Does not contain central message or identifiable organizational pattern.
Transitions	Effective, smooth transitions that indicated transitions in presentation topic or focus.	Included transitions to connect key points but speakers often used fillers such as um, ah, or like.	Included some transitions to connect key points but over reliance on fillers was distracting.	Presentation was choppy & disjointed with a lack of structure.
Conclusion	Ends with accurate conclusion tying content back to opening with a dynamic close. Transitioned into close.	Ends with a summary of main points showing some evaluation but is choppy.	Ends with a recap of key points without adding a closing twist.	Ends with only a recap of key points or with no transition to closure.
Length (<i>15 minutes</i>)	Time used efficiently. Within +/- 20 seconds of allotted time.	Within +/- 40 seconds of allotted time.	Within +/- 1 minute of allotted time.	Substantially longer or shorter than indicated by assignment.
Visual Aids (where appropriate)	Professional & easy to read. Materials enable speakers to focus on presentation & provide audience with important resources for later consideration.	Contain appropriate material but too much text. Materials provide useful information for further consideration but may not directly relate to central topic.	Occasional typos, unclear organization, and/or questionable applicability to presentation. Significant amount of text.	Many typos or too much text on slides. Material either identical to speaker’s speech or completely disconnected from it, OR does not include handouts.
Gestures/ Posture	Confident demeanor, gestures of all members add to style, & hands are used to describe or emphasize.	Confident demeanor; some members may need to add or subtract gestures to emphasize points.	Most members have slumping posture, hands stuck at sides or on podium OR Shifting weight or pacing.	All members show slumping posture, hands stuck at sides or on podium & Shifting weight or pacing.
Audience Engagement	Involved audience in presentation; held their attention throughout by getting them actively involved in the speech & using original, clever, creative approach.	Presented facts with some interesting “twists”; held attention most of the time by interacting with them. Good variety of materials/media.	Multiple members went off topic & lost audience. Failed to utilize method to pull the audience into the speech.	Members avoid or discourage active audience participation.

Appearance of speakers	All members appear appropriate for occasion & audience.	For the most part, all members appear appropriate for the occasion & audience.	Most members' appearance is somewhat inappropriate (hair keeps falling in eyes, jewelry distracting).	All members wear inappropriate clothes for event or audience.
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Appendix D-2
Online Discussion Topic Grading Rubric

Criteria	10	7	3	0
Quality of Original Post	Appropriate comments related to discussion content: thoughtful, reflective, and prompts further discussion of topic.	Appropriate comments related to discussion content.	Posts, but with minimum effort and topic relevancy.	Does not post.
Quality of Response Post to Classmate	Appropriate comments related to discussion content and respectful of other's postings.	Posts, but with minimum effort and topic relevancy.	Posts but fails to fully address the assigned response task.	Does not post
Quality of Writing and Proofreading	Uses language that skillfully communicates meaning to readers with clarity and fluency. Good use of transitions; no problems with spelling, punctuation, or grammar. Infrequent or minor mechanical problems.	Understandable language that generally conveys meaning to readers. Occasional errors and minor problems with mechanics of language. Occasional awkward sentences and poor transitions reduce readability.	Language generally conveys meaning to readers with clarity, with few writing errors. Frequent problems with mechanics of language. Awkward sentence structure. Poor or absent transitions. Frequently difficult to understand.	Language impedes meaning because of errors in usage. Problems with the mechanics of language serious enough to interfere with effective communication. Frequent errors in punctuation, spelling, sentence structure, etc.

Appendix D-3
Honors Documentary Grading Rubric

Criteria	4	3	2	1
The Pitch	The pitch presents a creative, clear theme, point and message. The main idea is clearly defined.	The pitch has a main idea, but some information doesn't fit.	The pitch has a weak or unclear main idea.	The pitch does not present a main idea.
Narrative	The storyline has a clear organizing structure and flows logically. Premise or issue is up front and introduced powerfully.	The storyline has an organizing structure but needs some improvement. Premise or issue being investigated is clear.	Storyline is disorganized.	No attempt at an organizing structure is in place.
Research Information	Information used is accurate, authenticated and well researched.	Information is adequately researched but needs improvement.	Information is not well researched and authenticated.	No apparent research of information.
Audience	Strongly considers and identifies intended audience: culture, age, psychographics etc.	Shows some consideration of intended audience	Doesn't adequately consider and identify audience.	No consideration of audience.
Effectiveness of Film	Film was effective, informative and appealing.	Film was either effective or appealing but not both.	Film was not interesting. Did not convey information or compelling message.	Not informative, interesting or engaging.
Indication of Thinking and Learning	Film showed creativity, high levels of teamwork and critical-thinking. Film terminology was well understood.	Film showed a basic command of the subject, but lacked some creativity and thoughtfulness.	Little indication of teamwork imagination, creativity, research, or thoughtfulness in the film.	No creativity or imagination used.
Timing	Film did not go longer than 15 minutes, and was 12-15 minutes of engaging content.	Film was 10-11 minutes of engaging content.	Film was 8-9 minutes of engaging content.	Film either went over time limit, did not exceed 8 minutes, or did not include engaging content.

Appendix E-1
Group Presentation Evaluation Forms (Used By Students)

Criteria	4	3	2	1
Introduction	Introduced topic & explained the purpose of presentation in creative, clear way, capturing attention.	Introduced presentation in clear way.	Started with a self-introduction or "Our topic is" before capturing attention.	Did not clearly introduce purpose of presentation.
Content Selection: <i>Microbial, Marketing</i>	All information was relevant & appropriate to requirements of the assignment.	Most information relevant; some topics needed expansion or shortened.	Information was valid but some was not explicitly related to the purpose.	Information not relevant to the audience or directly related to assignment.
Organization	Contains clear central message & clearly-identifiable sections featuring organizational pattern (chronological, problem-solution, analysis, etc.)	Central message is identifiable; sections vary in organizational pattern, which influences audience engagement level or comprehension of central message.	Central message is not clearly and/or easily identifiable by audience; sections may be in need of further organization & clarity.	Does not contain central message or identifiable organizational pattern.
Transitions	Effective, smooth transitions that indicated transitions in presentation topic or focus.	Included transitions to connect key points but speakers often used fillers such as um, ah, or like.	Included some transitions to connect key points but over reliance on fillers was distracting.	Presentation was choppy & disjointed with a lack of structure.
Conclusion	Ends with accurate conclusion tying content back to opening with a dynamic close. Transitioned into close.	Ends with a summary of main points showing some evaluation but is choppy.	Ends with a recap of key points without adding a closing twist.	Ends with only a recap of key points or with no transition to closure.
Length (15 minutes)	Time used efficiently. Within +/- 20 seconds of allotted time.	Within +/- 40 seconds of allotted time.	Within +/- 1 minute of allotted time.	Substantially longer or shorter than indicated by assignment.
Visual Aids (where appropriate)	Professional & easy to read. Materials enable speakers to focus on presentation & provide audience with important resources for later consideration.	Contain appropriate material but too much text. Materials provide useful information for further consideration but may not directly relate to central topic.	Occasional typos, unclear organization, and/or questionable applicability to presentation. Significant amount of text.	Many typos or too much text on slides. Material either identical to speaker's speech or completely disconnected from it, OR does not include handouts.
Gestures/Posture	Confident demeanor, gestures of all members add to style, & hands are used to describe or emphasize.	Confident demeanor; some members may need to add or subtract gestures to emphasize points.	Most members have slumping posture, hands stuck at sides or on podium OR Shifting weight or pacing.	All members show slumping posture, hands stuck at sides or on podium & Shifting weight or pacing.
Audience Engagement	Involved audience in presentation; held their	Presented facts with some interesting	Multiple members went off topic &	Members avoid or discourage active

	attention throughout by getting them actively involved in the speech & using original, clever, creative approach.	“twists”; held attention most of the time by interacting with them. Good variety of materials/media.	lost audience. Failed to utilize method to pull the audience into the speech.	audience participation.
Appearance of speakers	All members appear appropriate for occasion & audience.	For the most part, all members appear appropriate for the occasion & audience.	Most members’ appearance is somewhat inappropriate (hair keeps falling in eyes, jewelry distracting).	All members wear inappropriate clothes for event or audience.

Appendix E-2
Group Presentation Peer Evaluation Forms *(used by students)*

Write the name of each of your group members in a separate column. For each person **(including yourself)**, indicate the extent to which you agree with the statement on the left, using a scale of 1-4:
1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree.

Evaluation Criteria	Group member:	Group member:	Group member:	Group member:
Attends group meetings regularly.				
Arrives to group meetings on time.				
Contributes meaningfully to group discussions.				
Completes group assignments on time.				
Prepares work in a quality manner.				
Demonstrates a cooperative and supportive attitude.				
Contributes significantly to the success of the project.				
Respects each group member's opinions.				
"If given the opportunity, I would work with this person again."				
TOTAL				

Things to consider:

1. How effectively did your group work?
2. Were the behaviors of any team members particularly valuable or detrimental to the team? Explain.
3. What did you learn (whether positive or negative) about working in a group from this project that you will carry into your next group experience?

Adapted from a peer evaluation form developed at Johns Hopkins University (October, 2006)

Appendix F
Opening And Closing Reflections

Opening and Closing Reflection Essays: During the first and last weeks of the semester, you will write reflection essays that will ask you to focus on what you hope to gain or what you have gained from the course. The opening reflection essay will give you a platform for addressing what you expect to learn and what you would like to learn from this course. The closing reflection essay will ask you to assess your experience with the course. Each essay will be submitted on Canvas and guidelines for writing the essays will be provided.

Opening Reflective Essay (30 pts.)

Format and Submission Guidelines: 2 Page limit; typed and double-spaced; submit online.

Content of the Essay: This paper will give you an opportunity to reflect on what you hope to learn in this class and what you'd like to accomplish. Address the following:

- Reflect upon what you hope to gain from this class and how you think it might benefit you. Consider your academic interests and how they might benefit from discussions we will have this semester.
- Upon reviewing the topics we will cover this semester, is there anything that you are especially eager to talk about? Is there anything that you are maybe less eager to talk about? (Don't worry, there are no right or wrong answers here!)
- Reflect upon the impact taking a course taught by two instructors from two different disciplines. Do you think this might be beneficial? If so, how? Can you think of any potential drawbacks?

Evaluation Criteria: Grammar, spelling, punctuation; professionalism; completeness: address all the issues outlined in the "Content of the Essay;" quality and creativity

Closing Reflective Essay (30 pts.)

Format and Submission Guidelines: 2 Page limit; typed and double-spaced; submit online.

Content of the Essay: This paper will give you an opportunity to reflect on what you have accomplished and learned in this class. Address the following:

- Your most positive experience in this class.
- Your not-so-positive experience in this class, why it happened; what you could have done in order to change/avoid it.
- Your reflections on what you have gained from this class and how you think it might benefit you. If you feel you have not gained anything, feel free to say so and provide some perspective on how you would change this class so that you may benefit from it.
- Reflect upon your experience taking a course taught by two instructors from two different disciplines. What types of advantages and/or disadvantages did this present?

Evaluation Criteria: Grammar, spelling, punctuation; professionalism; completeness: address all the issues outlined in the "Content of the Essay;" quality and creativity