

Poster Project--Student Research in the Introductory Microbiology Lecture Curriculum

Resource Type: Curriculum: Classroom

Publication Date: 5/28/1999

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Abstract

Students display and discuss their research in a "Microbiology Poster Conference." Students choose their topic for investigation but must include an interview with a primary resource as part of their research. Posters provide opportunities for students to become experts and to apply critical and cross-disciplinary thinking to the microbiology curriculum.

Activity

Invitation for User Feedback. If you have used the activity and would like to provide feedback, please send an e-mail to MicrobeLibrary@asmusa.org. Feedback can include ideas which complement the activity and new approaches for implementing the activity. Your comments will be added to the activity under a separate section labeled "Feedback." Comments may be edited.

Editor's Note (2008): This Curriculum Resource was published prior to establishment of current criteria of submission, and as such, does not contain all criteria required of current publications. However, the Editorial Committee felt that the activity itself remained worthwhile and relevant, and encourages potential users to contact the authors for clarification as needed. If you do update this activity for use with your students, and are interested in updating the resource for distribution in the library, please contact ASM at MicrobeLibrary@asmusa.org.

PROCEDURE.

Materials.

Students provide the materials for their posters; these may include poster board, photographs, brochures, or other printed materials as well as their own written materials. In the college setting, the posters are produced outside of class. In a high school setting, it may be appropriate to devote classtime to this activity.

Student Version.

The goals of this project are to produce a poster and a one-page written summary that describes a prion, viral, bacterial, or parasitic disease of your choosing in terms of its route of transmission or portal of entry. You may approach the assignment from (A) a historical perspective, (B) current thoughts about the cause, treatment, or prevention of the disease, (C) environmental, social, or economic factors that may impact the reemergence or emergence of the disease, (D) new technologies that may impact future treatment or prevention strategies, or (E) from the perspective of public-health information.

The poster will have the following components: (1) a descriptive title, (2) abstract, (3) text and illustrations to support your topic. The illustrations may include photos, advertisements, public health information, interviews, or news articles. Although you may use some previously published illustrative materials, you must produce some original work to demonstrate that you have gathered information and applied it to your topic. The poster should be easily read from a distance of three feet, have a logical organization, and be visually attractive.

The paper will be a one-page summary of the information you gathered for the project. The paper will be passed in separately from the poster. Your references will be attached to the paper and will be listed using an AMA-type format. Your references should minimally include one media resource (TV, newspaper, magazine, or public-health brochure), one Internet resource (not a CD-ROM encyclopedia), and one text reference. In addition, you must get primary source information by interviewing (phone call or visit) one person who has experienced or who is personally knowledgeable about your topic.

Your project will be graded on the following criteria: meeting the portal of entry/route of transmission requirement, choosing an assignment-appropriate topic, listing appropriate references, producing a well-written abstract, content of one-page report as well as the content and appearance of the poster.

Instructor Version.

Posters provide an opportunity for students to pursue and become expert in a microbiology-related topic of their choosing. Because of the nature of the assignment, the poster session supports cross-disciplinary thinking and original research and allows the student to be a teacher, a mentor and a team player. A student poster session is a capstone assignment that should be scheduled near the end of the semester.

Using the poster assignment, students in medically based microbiology classes can be made responsible for "teaching" the

infectious disease portion of the course. Based on what they have learned about metabolism, control of growth, epidemiology and the other issues typically covered in undergraduate allied health curricula, students report on a specific disease. The approach they take, which must include route of transmission/portal of entry information for the causal pathogen, may be historical, diagnosis- or treatment-based, directed toward public education or have a research point-of-view. However, to assure that students engage in original research they are required to interview somebody that has either had the disease, witnessed the disease, or in some way is personally involved with the disease or the causal organism.

The poster assignment is easily modified for (microbiology) classes that serve the needs of students not anticipating a career in the allied health sciences. For these students, the assignment can be directed toward applied or environmental microbiology³/₄ waste water treatment, food production and safety, sick building syndrome and confined spaces, use of antimicrobials, animal control, and other topics that impact the consumer and the community.

The poster session is introduced during the first class meeting of the semester. At that time, the written assignment and grading requirements are passed out with the caveat that students should keep an eye out for interesting topics. A few examples of topics are mentioned and slides of earlier poster sessions are shown. After the first hour exam, the poster assignment is mentioned again; students discuss their ideas and start to form interest groups. Around mid-term I ask what they are planning on doing. Topics are listed on the board; where there is over-lap, we discuss variations or different topics are suggested. Students who are not attached to a group are encouraged to join or form a group. About two weeks before students' presentations, an "abstract and poster session application" is passed out; students submit their poster title, abstract and names of the group participants. The grading criteria, with assigned points, are also listed on the "application." The poster application is passed in on the day of the poster session and is used by the instructor to grade the project. This approach has worked well, in my experience, with classes from fifty to one hundred students.

The poster session can take place in the classroom or in some other part of the school. Students may give short presentations about their poster, as well as walk around and visit other posters. Students take turns staying with their poster to answer questions.

Grading the poster is time consuming. Part of the grading can take place during the poster session itself. However, it is often necessary to grade the posters and the papers that accompanies them at a later time.

Safety Issues.

Students should not include actual biological or pharmaceutical samples, patient specimens, syringes, or other medical supplies on their poster or as part of their display. Remind students of the potential safety hazards associated with displaying those items in a public environment. Develop poster standards that are similar to those found in a professional conference rather than what is often seen in local science fair displays.

ASSESSMENT and OUTCOMES

Suggestions for Assessment.

One grading scheme for assessment of the students' poster projects includes the following elements and relative weights:

1. "Does it meet the portal of entry/route of transmission requirement?" (5 points);
2. "Does it meet the historical, current, future or emergent/resurgent point of view requirement?" (5 points);
3. References (8 points: appropriate format (5), media reference (1), text reference (1), and Internet reference (1));
4. Abstract of 250 words or less (10 points: content (5), writing (5));
5. Report (22 points: content (11), writing (11));
6. Poster (34 points: overall appearance (6), information (20), readability (4), use of visuals (4)).

Student Data.

At first my students were very worried about the required interview. Who could they interview? Where could they find somebody and would that person refuse? Much to their surprise the interview was the best part of the project. It was real research - they had found out something new that was not in a book. Many times the interview ended up making a deep and emotional impact on both the student and the person interviewed.

One group of students who was doing research on the history of wastewater treatment in Albuquerque told me about their adventures with "the interview." They found a man, by going through old records, who worked at the plant in the 1930's. They told me that he was so excited about two young women coming to visit. He put on his best pants, wore both a belt and suspenders, and insisted on making tea for them. Even his grandchild had never asked him about his days at the sewer. Their project is now on permanent display at the city administration building. Their project was the first time that anyone had put together the historical records about wastewater treatment.

Another student did a project on the flu of 1918. She visited an elderly woman whose mother had died in 1918 from influenza. The woman had been 2 years old at the time. She spoke about the sadness about her mother's death that she had throughout her life and about how she felt that she might have somehow been at fault. The student told her more about influenza and got the impression that the discussion helped to ease feelings of guilt. The interviewee gave the student a photo - and asked that it be included on the poster. It was a photo of a young child sitting on her mother's lap - dated 1918.

Another group of students found relatives of an old prominent family that came to Albuquerque for a tuberculosis (TB) cure. From them, the students found out that the origins of the symphony orchestra and many of the art museums are a result of "back east" people coming to Albuquerque during the sanitarium years. The students also took an architectural tour of homes that were built to accommodate the "lungers" - all with sun porches facing south.

Many of the students found that their interviews were very important to those who were interviewed. Many of the interviewees had never spoken about the impact of TB, polio or influenza on their lives. They were so surprised that somebody was interested and very proud to have participated in the student's project. In many ways the interview helped students to connect with the community and understand the impact of microbiology on our daily lives.

Problems and Caveats.

It is essential to be very straightforward on grading. Provide each student with a grading sheet when they begin their project so they know the exact criteria on which they will be graded. Students put a lot of work into these projects and they should not be in the situation of receiving a poor grade due to a misunderstanding of the instructor's expectations. Also, having a grading sheet makes it easier to grade the assignment objectively and prevents situations where one is responding unfavorably to an unattractive poster as opposed to a poster that is missing content. Unless you feel differently, students' posters must include some original writing and should not be simply a display of published materials and brochures.

Set some defined guidelines for appropriate topics. If this is not done, there will be students who will put a lot of time into pursuing a topic that may not be appropriate for a microbiology class. Many students need the guidelines as a jumping off place for ideas.

Students should choose their own topic within the assigned microbiology criteria. Although students are often very interested in allergy or medicinal botany, make sure they understand the requirement to develop these themes with an unmistakable microbiology emphasis. Several times during the semester, check to make sure each student has latched onto a topic and a work-group. This gives you the opportunity to make sure their topic fits the assignment and to assure that a broad range of subjects will be displayed at the poster conference.

Make it very clear if students will be graded as a group or as individuals within a group. Try to make them responsible for management of their team, but do step-in, when asked, if there are difficulties with team dynamics.

If the posters are displayed in a public area, you may find that some people are offended by the subject matter. I no longer display posters in the Student Service Building due to complaints and defacement of student work – STD posters being the prime targets.

The optimal size for a poster-team is 2 or 3 people.

Student team-members should list their names in alphabetic order on the poster. No need to add "first-author" battles in this situation.

SUPPLEMENTARY MATERIALS**Sample Application.**

There are many ways that "Hosting a Microbiology-Student Poster Conference" can be applied to your class syllabus. Some of the variations that I have tried include: poster displays during scheduled classtime, poster displays in a public area of the college (school), and a large poster convention that includes student work from several lecture sections or different microbiology classes held outside of the normal classtime. This last variation is one that students like the best. For example, a two-hour, Friday afternoon poster session for including multiple classes (as many as two hundred students) has worked well. Students who may not otherwise interact have the opportunity to see the work of others in a friendly and collegial atmosphere. In addition, faculty from other departments as well as friends and family are invited to the poster convention. Prizes, books donated by local book representatives, provide an added source of excitement and a sense of achievement for the participating students. Each time that I have used the Poster Conference activity, I have arranged for students to bring their posters to a local high school for display in a health class. This helps to make the poster more valuable and relevant than "just another assignment for a grade." In addition, this brings timely, high quality information to high school students, perks their interest in college and microbiology, and gives them some insight into the expected quality of college-level work.

Figure 1: Students may invite friends and family members to the poster convention.



Figure 2: Historical posters give students the opportunity to do primary resource research using newspaper archives or by interviewing people who "remember when."

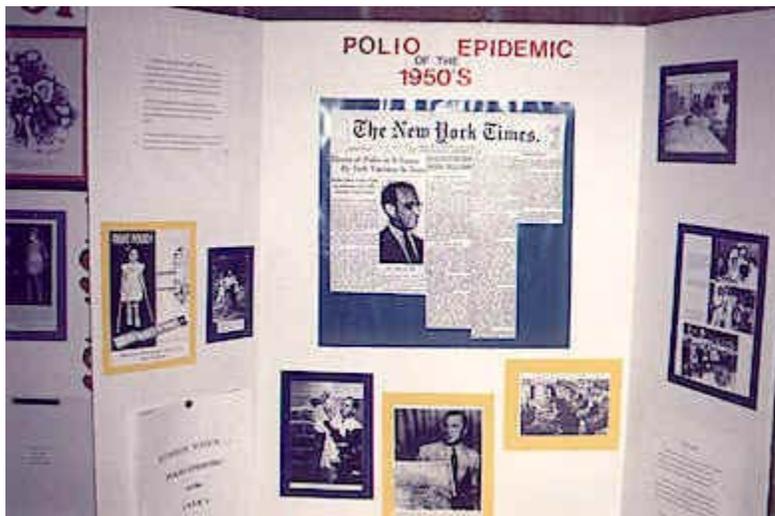


Figure 3: Other poster topics reflect student career goals. The student who made this poster said that it helped her to write a better application for optometry school.

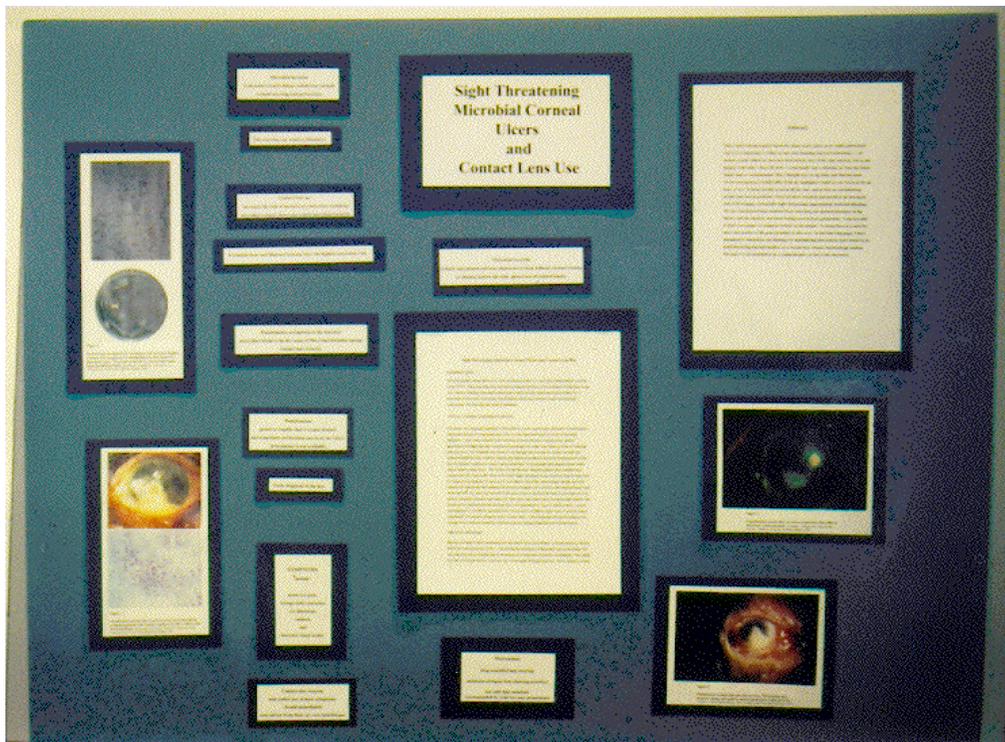


Figure 4: A microbiology poster convention includes student work from two different Allied Health Microbiology lectures and one Environmental Microbiology class.

