Using a Team Structure for Student-Assisted Facilitation of Laboratories in an Introductory Allied Health Microbiology Course *

David Jesse Sanchez* and Daniel Miranda, Jr.

Department of Pharmaceutical Sciences, College of Pharmacy, Western University of Health Sciences, Pomona, CA 91766, and Life Sciences Department, Los Angeles City College, Los Angeles, CA 90029

INTRODUCTION

As many instructors have noted, it is challenging to lead a successful microbiology laboratory, especially for students without sufficient prerequisite training such as in pre-allied health/nursing classes. In the community college setting, this is compounded by the lack of adequate resources, especially teaching assistants or others, to help individual students during a laboratory experience. In addition, there is much transition in the student population of the college so asking students who have completed a class to help in this setting is often impractical.

Our goal in designing a team structure in the laboratory was to facilitate students working together more efficiently during the laboratory. However, we noticed that students still felt hesitant to ask each other for even minor assistance or ask each other basic questions, and were often unable to ask the instructor questions when multiple students needed assistance. Because our class has limited resources to provide for teaching assistants who have taken the course, we looked to work with current students. To modify our system to allow students to more easily ask questions and get feedback, we designed a student facilitator system. This system allowed each student to be a leader of the team for a particular laboratory experience. Each student was individually trained to be supportive of the team as a whole. This program is useful in that it can be applied to any class-based laboratory setting to provide better student team interactions than if there were no facilitator.

PROCEDURE

Organization of the team system

This system was implemented in a General Microbiology laboratory course for pre-nursing and pre-allied health students where teamwork skills are an integral part of the training. The laboratory class consists of 32 students. As the students taking this class are primarily pre-nursing and other allied health students, the students often do not have a standardized, in-depth background in science and consistently have not taken many college-level laboratory classes in their educational career. The class is divided into four teams of eight students. Eight laboratory experiences were chosen to be assisted by student facilitators in our first setup of this program. To set up teams quickly, teams were assigned based on seating. Facilitation dates could be pre-assigned, depending on instructor preference.

Training the student facilitator (week prior to facilitation experience)

In our class, each student chose which date they would assist as a student facilitator. Participation in this program constituted a portion of their laboratory participation grade. In the laboratory prior to their assigned laboratory (in this case the week before), students were given the procedure for the next week and asked to review the procedure prior to the next laboratory. The students who were going to be facilitators the following week were asked to stay an additional 30 minutes after laboratory of the week prior to the facilitation. Facilitators-to-be were given a form (see Facilitator Handout form in Appendix 1) to prepare for their facilitation, along with the lab protocol that all students assist as a student facilitator. Participation in this program constituted a portion of their laboratory participation grade.

During this preparation time, students were given a hands-on demonstration of the laboratory experience to be performed the following week. In addition to the theory and background, the method of the experiment, and the results, student facilitators were given insight into what common questions would be encountered by their teammates. Also, as with all laboratory scenarios, safety issues as well as potential obvious mistakes were explained to the students. It should be noted that it is important to create a culture of safety within a laboratory setting with all participants well versed in safety. However, the instructor is ultimately and solely responsible for safety, so the facilitators should be made aware of safety concerns but are not responsible for them more than any other student in the classroom. For example, we used student facilitation in learning how to Gram stain bacteria. Gram staining is a fundamental technique in

*Corresponding author. Mailing address: Department of Pharmaceutical Sciences, Western University of Health Sciences, 309 East Second Street, Pomona, CA, 91766-1854. Phone: 909-469-8479. Fax: 909-469-5600. E-mail: sanchezd@westernu.edu.
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 introductory microbiology laboratories and requires hands-on experience for mastery of the technique and theory. We felt that Gram staining would benefit from student-assisted facilitation to allow more support of the students as a whole (A summary of the facilitators’ comments is given in Appendix 2). Note that Gram + and – organisms were used in the actual lab, but in the facilitator training the students used only Gram + bacteria.

Depending on the schedule of the laboratories, it might be impractical to have facilitator training between classes or after class. In that case, the instructor may wish to create a written or video-based training to prepare the facilitator, coupled with completion of a facilitator pre-lab handout.

**Day of facilitation**

The lab experience to be facilitated is done as in previous semesters. For our example experience, the theory of the Gram stain is presented in conjunction with didactic lectures on cellular structures and microscopy theory. A general overview of the procedure is presented in didactic lecture, and the detailed protocol is gone over by the instructor with all the students. Students are given a detailed demonstration with the instructor doing all the steps in real time of the Gram stain procedure from start to finish. Afterwards, students are asked to perform the Gram stain on both Gram + and Gram - bacteria; students then observe the stains with a light microscope to see the different outcomes.

Before students begin their procedure, student facilitators are asked to identify and introduce themselves. The instructor gives ideas to the class on what types of questions are appropriate for the students to ask the facilitators. There are many small steps and details that the students are anxious or concerned about in these laboratory sessions and the facilitators are able to help with these questions or direct them to talk to the instructor. In this system, the facilitators also complete the laboratory experience to stay up to date with the students. Facilitators are also in a better position to assist other team members in how to do a particular procedure.

**CONCLUSION**

This model of student-based facilitation is currently being assessed to determine how well student ownership of the laboratory material is achieved. This model of facilitation works toward student ownership of material in that they will be part of the learning and see themselves and their peers as actively part of the learning environment and not just passively following a protocol. The basic goals have been achieved: (1) to provide students with additional people in the laboratory to whom they can turn during hands-on experiences, and (2) to create a culture of teamwork among the students. The students in this program are often preparing to apply to nursing and allied health programs that will require significant team components in their curriculum. In fact, most programs ask instructors to evaluate the students’ performance in letters of recommendation for students. One of the main outcomes of student facilitation is that students are better able to work with each other and communicate with each other to seek solutions to problems, than in classes without student facilitators.

There has been much positive feedback from the first teams of students who were allowed to participate in the program, as students have benefited from the team aspect of the program, which allows for better communication and a more collegial attitude in the classroom. As noted in the summary of student comments (Appendix 2), the facilitators greatly benefited from being part of the teaching process for other students. In addition, the teamwork and connections among the team were significantly strengthened by this program. One issue that we saw was that the student facilitators were often very busy during their laboratory time; it is recommended that only a few sessions (preferably one) be assigned to any one student throughout the semester. In addition, there was much initial concern by students that there would be little to no instructor contact during this program. In actuality, there was more time spent one-on-one with students as the student facilitators helped students in their teams and the instructor was better able to assist many students throughout the classroom.

All in all, student facilitation is useful for programs with limited resources for additional teaching assistants and for classes that could benefit from additional sources of assistance for learning in a laboratory setting.

**SUPPLEMENTAL MATERIALS**

Appendix 1: Template Facilitator Handout
Appendix 2: A Sample of Facilitator Comments

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