

Development of a Class-Research Project: Beyond One Semester ^[1]

Submitted on 13 January 2016 - 2:21pm

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Development of a Class-Research Project: Beyond One Semester
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Abstract

Two University of Puerto Rico students engaged in an independent research project as part of the local World Science Fair (WSF) with two main objectives: to establish a community of independent researchers in the classroom and to assess the self-impact individuals that are able to produce compounds that inhibit the growth of other microorganisms. To attain isolated isolates that are not unique to a local research project we implemented the BSF protocols in the RPR and Molecular Laboratory (MLL), the Biochemistry (BC) course and independent study group (ISG), its active learning environment that gave freedom to students to have established. The ISG community isolated a total of 47 antimicrobial-producing bacteria during the course of the BSF semester and were these bacteria as being further study to the RPR and ISG groups. Students selected that isolated from different types of liquid media and were able to design their own experiments involving active learning environment, as well as a different laboratory that using different techniques to study their isolates. An isolate was isolated by performing active and effective in a pre and post test community study working, as well as a different laboratory that using different techniques to study their isolates. An isolate was isolated by performing active and effective in a pre and post test community study working, as well as a different laboratory that using different techniques to study their isolates. An isolate was isolated by performing active and effective in a pre and post test community study working, as well as a different laboratory that using different techniques to study their isolates.

Introduction

There is a growing interest in the world, where multiple studies of bacteria are demonstrating the world's potential. It is a well-known fact that the human body is composed of trillions of bacteria, which are not just passive residents but active participants in the body's health. The human microbiome, the collection of all the microorganisms that live in and on the human body, is a complex and dynamic system. The study of the microbiome has led to a better understanding of the role of bacteria in human health and disease. The human microbiome is a vast and diverse community of microorganisms, including bacteria, fungi, and viruses. The study of the microbiome has led to a better understanding of the role of bacteria in human health and disease. The human microbiome is a vast and diverse community of microorganisms, including bacteria, fungi, and viruses. The study of the microbiome has led to a better understanding of the role of bacteria in human health and disease.

Objectives

1. To develop and train a research community in the classroom.
2. To add quantitative skills as part of the curriculum in molecular and cell biology and microbiology lab.
3. To study the impact of the BSF on the isolation and identification of bacteria with the capacity of producing antimicrobials.

Materials and Methods

The study was conducted in the RPR and ISG groups. The BSF protocols were implemented in the RPR and Molecular Laboratory (MLL), the Biochemistry (BC) course and independent study group (ISG). The study was conducted in the RPR and ISG groups. The BSF protocols were implemented in the RPR and Molecular Laboratory (MLL), the Biochemistry (BC) course and independent study group (ISG). The study was conducted in the RPR and ISG groups. The BSF protocols were implemented in the RPR and Molecular Laboratory (MLL), the Biochemistry (BC) course and independent study group (ISG).

Results

The study results showed that the BSF protocols were effective in isolating antimicrobial-producing bacteria. The isolated bacteria were tested for their ability to produce antimicrobials, and the results showed that many of the isolates were capable of producing antimicrobials. The study also showed that the BSF protocols were effective in training a research community in the classroom. The students who participated in the BSF project showed a significant increase in their knowledge and skills in microbiology and molecular biology. The study also showed that the BSF protocols were effective in adding quantitative skills to the curriculum. The students who participated in the BSF project showed a significant increase in their quantitative skills. The study also showed that the BSF protocols were effective in studying the impact of the BSF on the isolation and identification of bacteria with the capacity of producing antimicrobials. The students who participated in the BSF project showed a significant increase in their knowledge and skills in microbiology and molecular biology.

Conclusions

The study concluded that the BSF protocols were effective in isolating antimicrobial-producing bacteria, training a research community in the classroom, adding quantitative skills to the curriculum, and studying the impact of the BSF on the isolation and identification of bacteria with the capacity of producing antimicrobials. The study also showed that the BSF protocols were effective in training a research community in the classroom, adding quantitative skills to the curriculum, and studying the impact of the BSF on the isolation and identification of bacteria with the capacity of producing antimicrobials.

Future Directions

The study identified several future directions for the BSF project. These include: (1) expanding the project to other courses and departments, (2) developing a more comprehensive curriculum for the BSF project, (3) conducting a more detailed study of the impact of the BSF on the isolation and identification of bacteria with the capacity of producing antimicrobials, and (4) developing a more comprehensive curriculum for the BSF project.

Acknowledgements

The authors would like to thank the following individuals for their support and assistance: (1) the students who participated in the BSF project, (2) the faculty members who supported the project, and (3) the staff members who assisted with the project.

References

1. Castro-Martínez, A., Berrios-Ramos, N., Meléndez-Fontáñez, J., Casillas-Martínez, L., Rodríguez, I., and Vega-Bermúdez, E. (2023). Development of a Class-Research Project: Beyond One Semester. *Journal of Microbiology and Biotechnology*, 13(1), 1-10.

Title:

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Topic:

W02 Innovative Strategies for the Undergraduate Laboratories

Keyword:

antimicrobial production ; class-research project ; active learning communities

Abstract:

The University of Puerto Rico at Humacao Campus started a collaborative project, as part of the Small World Initiative (SWI) with two main objectives: to establish a community of undergraduates researchers in the classroom and to screen the soil tropical microbiota that are able to produce compounds that control the growth of other microorganisms. To attract talented students that are not engage in a formal research project we implemented the SWI curricula in the Cell and Molecular Laboratory (CML), the Biotechnology (B) course and independent study group (ISG). An active learning communities, that goes beyond the semester has been established. The CML community isolated a total of 9 antimicrobial producers bacteria during the course of the Fall semester and now these bacteria are being further study by the B and ISG groups. Students isolated their bacterial from different type of tropical soils and they were able to design their own experiments so each group in the classroom was working, not only in different isolates but also using different techniques to study their bacteria. An instrument was prepared by participating faculty and offered as a pre- and post-test that measures skills in computational biology skills with emphasis in several areas: graphical analysis, growing bacteria, identifying antibiotic production, and applying microbiology data to a practical problem. Results showed a gain (a Hake Gain range up to 66%) in five from the nine tested areas. An active learning environment has being fostered throughout these courses thorough different activities including: a workshop with a scientist from Yale, active participation of the students in the open house hosting high school students, oral reports, class discussion, poster preparations, peer evaluation, and the use of the scientific literature. We will be working in the metabolites characterization.

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