

The bean beetle microbiome project: The impact of student-autonomy on science identity, project ownership, and abilities to overcome perceived challenges in course-based undergraduate research experiences

A. Zelaya¹, S. Younge, N. M. Gerardo², L. S. Blumer³, and C. W. Beck²

¹California State University San Bernardino, Department of Biology, 5500 University Parkway, San Bernardino, CA, USA

²Emory University, Department of Biology, 201 Dowman Dr., Atlanta, GA, 30322, USA

³Morehouse College, Department of Biology, 380 Westview Dr. SW, Atlanta, GA, 30314, USA

(anna.zelaya@csusb.edu; ngerard@emory.edu; lawrence.blumer@morehouse.edu; cbeck@emory.edu)

Recent calls for increased inclusion in & access to authentic course-based research have been building on the momentum of support for Course-Based Undergraduate Research Experiences (CUREs). However, these courses can be very challenging to implement at scale or with low resources. To equitably provide these critical science process skills to the largest possible cohort of students, we have developed a new student research project within our first-year biology lab. Our student team research project is integrated throughout the semester, building authentic science process skills from start to finish. Students start from a research idea, develop a multi-site experimental design, do hands-on data collection at home, analyze quantitative data, and present their findings in a conference-style format. We have also embedded structured time for building collaborative skills. This novel change to our lab curriculum runs online, hybrid or face-to-face; it has no lab budget costs; and it has been well-received in multiple offerings of our course of ~200-600 students. It also has allowed us to improve our assessments: we evaluate writing (graphical abstracts) and/or oral presentation skills. Further, our lab exam can now be more cognitively challenging because our new curriculum better prepares students to analyze, evaluate, and synthesize. This article demonstrates that we can reduce barriers to doing authentic research, at scale in introductory courses; and we include here all materials needed to adapt this project to your own context.

Keywords: Bean beetles, microbiome, CUREs

Mission, Review Process & Disclaimer

The Association for Biology Laboratory Education (ABLE) was founded in 1979 to promote information exchange among university and college educators actively concerned with teaching biology in a laboratory setting. The focus of ABLE is to improve the undergraduate biology laboratory experience by promoting the development and dissemination of interesting, innovative, and reliable laboratory exercises. For more information about ABLE, please visit <http://www.ableweb.org/>.

Papers published in *Advances in Biology Laboratory Education: Peer-Reviewed Publication of the Conference of the Association for Biology Laboratory Education* are evaluated and selected by a committee prior to presentation at the conference, peer-reviewed by participants at the conference, and edited by members of the ABLE Editorial Board.

Citing This Article

Zelaya A, Younge S, Gerardo NM, Blumer LS, and Beck CW. 2023. The Bean Beetle Microbiome Project: The impact of student-autonomy on science identity, project ownership, and abilities to overcome perceived challenges in course-based undergraduate research experiences. Abstract 54 In: Boone E and Thuecks S, eds. *Advances in biology laboratory education*. Volume 43. Publication of the 43rd Conference of the Association for Biology Laboratory Education (ABLE). <https://doi.org/10.37590/able.v43.abs54>

Compilation © 2023 by the Association for Biology Laboratory Education, ISSN 2769-1810. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the copyright owner. ABLE strongly encourages individuals to use the exercises in this volume in their teaching program. If this exercise is used solely at one's own institution with no intent for profit, it is excluded from the preceding copyright restriction, unless otherwise noted on the copyright notice of the individual chapter in this volume. Proper credit to this publication must be included in your laboratory outline for each use; a sample citation is given above.