

Data Analysis for Biology Students: An Integrated Developmental Biology Laboratory and R Programming

Rabi Murad and Debra Mauzy-Melitz

University of California – Irvine, Developmental and Cell Biology, Irvine CA 9267 USA
(rmurad@uci.edu)

Data analysis is increasingly gaining importance in biological research and industry careers. Biology students are usually exposed to statistics through a single basic statistics course without any integrated learning and application of these skills in biological contexts. Biology laboratories provide a unique opportunity to reinforce the concepts of statistics and data analysis and help students put these concepts into practice while analyzing their own data. We integrated statistics, and graphing with R programming within a developmental biology laboratory. Concepts from statistics were introduced each week that were relevant to the type of data collected and related R functions were introduced so that the students could analyze their data. Students were introduced to the concepts of p-values, effect size, and statistical power to critically assess their results and draw conclusions. Learning outcome assessments were based on pre-lab quizzes and the analysis section of final lab report. In this workshop, we will provide an overview of the R and statistics lesson plan we used during the 10-week class, our approach to teaching such curriculum, and the challenges we faced in teaching it. We will also provide attendees datasets and content background to simulate what was done in class.

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 *Tested Studies for Laboratory Teaching: Peer-Reviewed Proceedings 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

Murad R, Mauzy-Melitz, D. 2018. Data Analysis for Biology Students: An Integrated Developmental Biology Laboratory and R Programming. Article 46 In: McMahon K, editor. *Tested studies for laboratory teaching*. Volume 39. Proceedings of the 39th Conference of the Association for Biology Laboratory Education (ABLE). <http://www.ableweb.org/volumes/vol-39/?art=46>

Compilation © 2018 by the Association for Biology Laboratory Education, ISBN 1-890444-17-0. 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 proceedings 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