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BACKGROUND

Biology is a discipline that makes extensive use of mathematical models, numerical tools, data management, and statistical analysis.

In the course of their curriculum, **biology students must acquire numerical skills and quantitative competence** to better comprehend biological theories, systems and problems ('Vision and Change'; AAAS 2011). However, many students do not appear to successfully translate these skills into their subject context.

In the classroom, educators face the challenge to keep their audience engaged and confident when trying to apply quantitative reasoning. Even if **courses in mathematics and statistical analysis** are compulsory in the curriculum, they either **seem maladapted to biological problems**, or **fail to put numerical knowledge into the biological context** (Touchon et al., 2016). Most higher-education institutions also lack a concrete plan for giving students and teachers the tools to make numeracy a transferable skill in courses and study programs (Speth et al. 2010).

OBJECTIVES

- A. PROVIDE **STUDENTS** WITH ASSISTANCE
1. Create clear tutorials that help students learn the basics
 2. Illustrate the tutorials with relevant examples in biology
 3. Provide students with (links to) relevant resources
- B. PROVIDE **TEACHERS** WITH RESOURCES
4. Provide teachers with relevant, adapted course material
 5. Create relevant contents in partnership with teachers

BROAD USE OF VIDEOS AS ILLUSTRATION

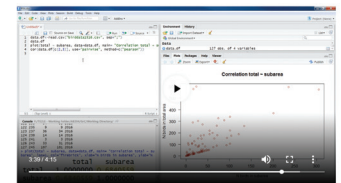
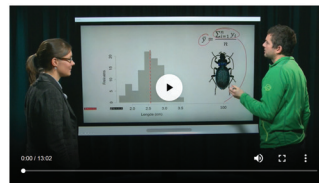


Illustration videos increase student **achievement, competence, learner satisfaction and engagement** (Dupuis et al., 2013; Oruset al., 2016; Sherer & Shea, 2011).

bioST@TS offers assistance with MS Excel, R and NetLogo



bioST@TS tutorials are aimed at two educational levels:

Undergraduate modules focus on the basics of data management and visualization in MS Excel 2016.

Master modules include statistical analysis and apply the open source programme R, with instructions to the coding needed in this programme.

9. Add a trendline to a data series

3. Summary of the dataframe

6. Quartiles

bioST@TS tutorials are illustrated with screenshots, videos, scripts that can be directly copied and pasted into R, data files and data sets, etc.

STUDENTS AS PARTNERS



In collaboration with bioCEED/PRIME project **Teach To Learn**, (<http://teach2learn.w.uib.no>), **biology students create video tutorials** while learning statistical analysis and use of R/Rstudio.

bioST@TS AS AN EFFECTIVE COURSE SUPPLEMENT

A pilot study suggests that bioST@TS video resources constitute an **effective tool as a supplement to regular teaching**. The survey data suggests that students have a slightly higher mean difference in **enjoyment, confidence and abilities**, and lower mean in **boredom**.

Speth et al. 2010 Speth E.B., Momsen J.L., Moyerbralle G.A., Elbert-May D., Long T., Wyse S., Linton D. (2010) 1,2,3,4: infusing quantitative literacy into introductory biology. CBE – Life Sciences Education 9: 323-332. 'Vision and Change'; AAAS 2011 American Association for the Advancement of Science (AAAS) (2011) Vision and change in undergraduate biology education: a call to action. AAAS, Washington, DC, USA. Touchon et al., 2016 Touchon J. C., and M. W. McCoy (2016) The mismatch between current statistical practice and doctoral training in ecology. Ecosphere 7(8): e01394. Dupuis et al., 2013 Dupuis, J. e., Coutu, J. e., & Laneuville, O. (2013). Application of linear mixed-effect models for the analysis of exam scores: Online video associated with higher scores for undergraduate students with lower grades. Computers & Education, 66, 64-73. Orus et al., 2016 Orus, C., Barlés, M. a. J., Belanche, D., Casaló, L., & Fraj, E. (2016). The effects of learner-generated videos for YouTube on learning outcomes and satisfaction. Computers & Education, 95, 254-269. Sherer & Shea, 2011 Sherer, P., & Shea, T. (2011). Using Online Video to Support Student Learning and Engagement. College Teaching, 59(2), 56-59.

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