



PTAS Project Report (for REGULAR PROJECT GRANTS)

Project Title: “ShinyStats”: A new interactive and engaging statistics training application to complement existing resources

Project type:

B Innovation Project (introduction and evaluation of an educational innovation, usually taking a practical approach)

Principal Investigator : Riinu Ots

Schools/department : Clinical Surgery, Division of Health Sciences

Team members (including Schools and Departments) :

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What did you do?

We have created “ShinyStats”: a series of web-based interactive applications to aid teaching statistics. It is freely available for anyone with an internet connection to access at shinystats.org.

Students are given example data to interact with; for instance, they can manipulate the number of observations, standard deviation, (true) effect size, etc. ShinyStats then immediately provides a visual representation of their sample, as well the results of different statistical tests incorporating their changes.

The statistical methods and concepts included in ShinyStats are: t-test, ANOVA, Chi-squared, Simple regression, Multivariable regression, interactions and confounding, and Bayesian analysis of two proportions.



We now use ShinyStats in our own teaching on the following courses: MSc in Surgical Sciences, MSc in Primary Care Ophthalmology, MSc in Patient Safety and Clinical Human Factors, ChM in General Surgery, ChM in Trauma & Orthopaedics, ChM in Urology, ChM in Vascular & Endovascular, ChM in Clinical Ophthalmology, and the HealthyR suite of training courses (<http://healthy.surgicalinformatics.org/>).

What did you find out?

ShinyStats is a useful tool and we cannot imagine teaching some of the concepts, especially interactions and confounding, without it. However, it works best if a lecturer or tutor first shows the students how to use it, for example in a webinar or presentation. Without this introduction, it is still hard for students to overcome their initial 'statistics anxiety'. Therefore, future developments could include embedding introductory videos into ShinyStats – to encourage independent learning.

How did you disseminate your findings?

- Included in our book: HealthyR: R for Health Data Analysis (to be published with CRC Press/Chapman&Hall in 2020)
- Signposted at <https://surgicalinformatics.org/training/>
- The Association for Medical Education in Europe (AMEE) annual conference – poster.

We know that these dissemination channels work well, as a professor at the University of Western Ontario was able to discover ShinyStats purely by an online search. She has now embedded ShinyStats into case-based clinical teaching at her hospital, and a letter of endorsement from her has been attached to this report.

What have been the benefits to student learning?

The level of experimentation enabled with ShinyStats gives the students a more thorough understanding of statistical concepts. This benefits not only their own research and analysis but also the ability to understand the results quoted in published medical literature.

How could these benefits be extended to other parts of the university?

shinystats.org is freely available and does not require any installation – it works in the web-browser. Anyone in the university can start using it immediately. Since the grant is now finished, the continuing server fees for ShinyStats have been adopted by our department. Creating and embedding videos into the site may increase independent uptake – without the need of a lecturer or tutor introducing students to it.



Financial statement:

This project has utilised the funding awarded to it by the PTAS adjudication committee and the Principal Investigator or School Administrator appropriate can provide financial statements showing the funding usage as and when required by the UoE Development Trusts who may require it for auditing purposes.

Please send an electronic PDF copy of this report to:

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