

# Creating a UWE statistics e-Assessment community

## Background



Dr Iain Weir  
FET EDM

This poster reports on an inter-department/faculty UWE Learning & Teaching project that aims to create a community of lecturers who will be able to author and share relevant, authentic and engaging statistics e-Assessments that enrich the learning experience of students.



Dr Rhys Gwynllyw  
FET EDM

Statistics is taught across UWE by staff from the various faculties, many of whom do not know each other. These staff vary from those who are subject specific experts (predominantly EDM) to those who have statistics as a secondary skill. Hence statistics is taught by lecturers of varying degrees of ability and confidence.

By creating a UWE cross-faculty statistics e-Assessment community, both subject specific and learning & teaching practice can be shared under the expertise of an EDM statistician and Learning & Teaching Fellow.



Dr Sam Bonnet  
HAS BBAS

## Dewis-R interface

Dewis is a fully algorithmic open source e-Assessment system designed and developed by Gwynllyw at UWE. Dewis' ability to communicate with the R statistical programming language greatly facilitates the task of generating bespoke datasets and their subsequent analysis.

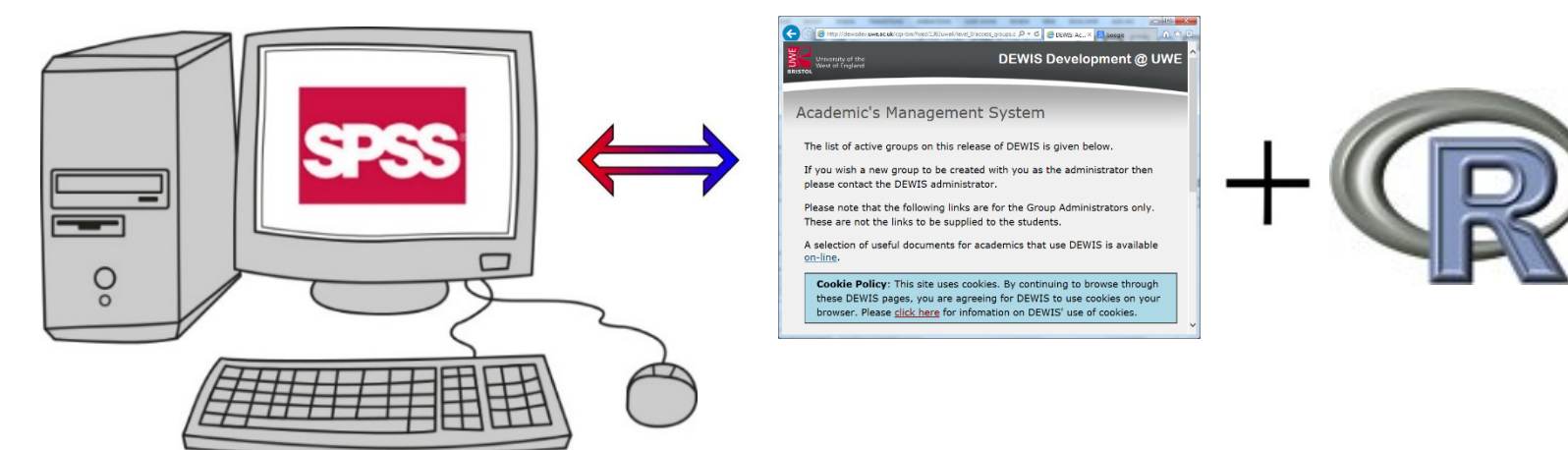
The main output in the first year of the project is the development by Weir & Gwynllyw of the Dewis-R interface which is an e-Assessment authoring tool where the questions are composed using a simplified Dewis question structure.



Dr Richard Mourné  
FET GEM



## e-Assessment mechanics



- A student logs on to DEWIS and downloads a bespoke data set that is generated using embedded code from the statistics programming language R.
- The student analyses the data using statistical software and uploads to DEWIS numerical results and analysis interpretation.
- DEWIS marks using answers generated from R to emulate what the student sees in the statistical software.
- DEWIS supplies full and immediate feedback.

## Join the community

During the first year of the project various statistics e-Assessments have been trialed by Bonnet & Mourné. The next task for them is to learn to author their own e-Assessments using the Dewis-R interface.

The project is now sufficiently advanced to welcome other UWE staff who are interested in the use of statistics e-Assessments in their teaching; please contact Iain Weir.

Interested parties can trial online some examples from the following web address:

**DEWIS-R Resource page**

<http://dewis.uwe.ac.uk/resources/stats>

## Example

Submit your answers

**The Question.**  
A supplier of bottled mineral water claims that his supply of water has a mean sodium content of 35.4 mg/L. The histogram below is of the sodium contents levels taken from a random sample of bottles.

**Histogram of sodium content levels**

Download the [data](#) and use Minitab to perform the **one sample t-test** at the 0.05 significance level.

Complete the following summary of your analysis.

H<sub>0</sub>: The mean sodium content  equal to 35.4 mg/L  
H<sub>A</sub>: The mean sodium content  equal to 35.4 mg/L

The mean of the  samples was found to be  (95% CI:  -  ) mg/L.

The one sample t-test provides  evidence to suggest that the mean sodium content level is not 35.4 mg/L (t() = , p = ).

**Further information**

- You need the sample size (N) and from it calculate the degrees of freedom (DF=N-1);
- Report the sample mean and its 95% confidence interval (CI) to two decimal places;
- Note the test reporting style of t(DF) = T-Value, p = P-Value;
- Report the T-Value to two decimal places;
- Report the P-Value value to three decimal places.

Screenshot of the example question which concerns the application of the one sample t-test to test the null hypothesis of a population mean.

**The Solution**

H<sub>0</sub>: The mean sodium content **is** equal to 35.4 mg/L  
H<sub>A</sub>: The mean sodium content **is not** equal to 35.4 mg/L

The mean of the **25** samples was found to be **35.53** (95% CI: **35.45** - **35.61**) mg/L.

The one sample t-test provides **sufficient** evidence to suggest that the mean sodium content level is not 35.4 mg/L (t(**24**) = **3.38**, p = **0.002**).

**The Report**

H<sub>0</sub>: The mean sodium content **is not** equal to 35.4 mg/L  
H<sub>A</sub>: The mean sodium content **is** equal to 35.4 mg/L

The mean of the **25** samples was found to be **35.53** (95% CI: **NotAns** - **NotAns**) mg/L.

The one sample t-test provides **sufficient** evidence to suggest that the mean sodium content level is not 35.4 mg/L (t(**25**) = **3.38**, p = **0.002**).

**You scored 5 marks for this question.**

Screenshot of the feedback for a students attempt showing the correct solution and the students submission that included wrong and not answered (NotAns) parts indicated in **red**.