

Early warning system – an Excel program for quick detection of problems with mark profiles

Written by Dr Nick Biggs, University of Reading, 2012

For details of the method behind this program, please see

Ayres, KL, Biggs, NRT and Glaister, P (2012) Statistical monitoring of student performance – an early warning system. *To appear, Proceedings of the HEA STEM Conference.*

Getting started

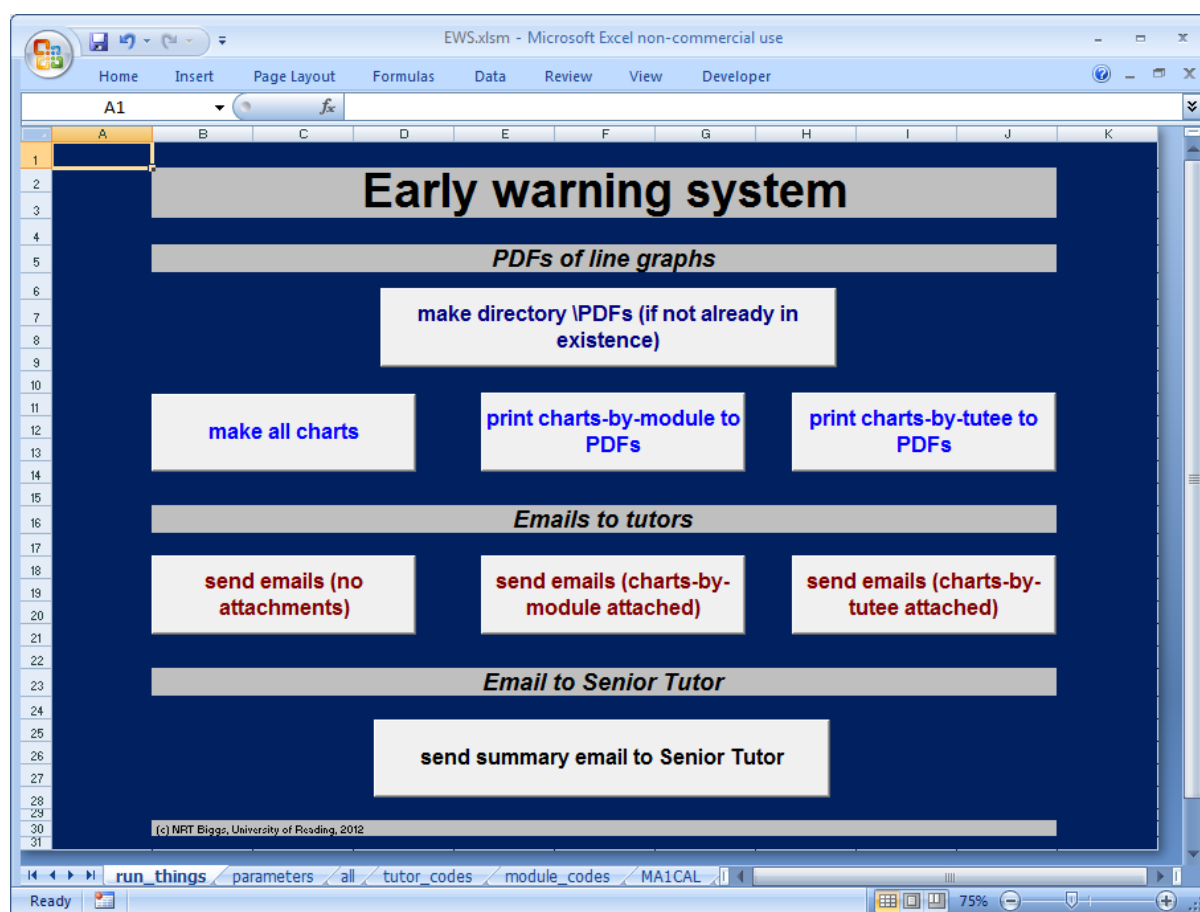
1. Paste into worksheet **all** tutee names, tutors etc. Ensure that column H of any row containing a tutee contains the command “=ROW()”. Tutor codes (column B) are inherited from the **tutor_codes** worksheet, so this also needs to be updated. Also in **tutor_codes**, copy and paste G1 into all cells of column G which contain tutor information, and similarly for H1 into other cells of column H. **Tutor codes need to be six characters in length. Student numbers need to be 10 characters in length and include a / within the 10 characters.** If this is not the case for your situation, then some cell entries will need changing in the worksheets.
2. Update worksheet **module_codes**. Note that the maximum number of modules which can be dealt with is 10.
3. Update if appropriate cell B1 of worksheet **parameters**, with the total number of weeks of marks to be input (typically the length of term or semester). Note that the maximum number of weeks which can be dealt with is 20. Update if appropriate the values of *k* used for the two control charts, and also the email address for the Senior Tutor (or whoever is overseeing students’ marks).
4. Each module listed in **module_codes** needs a correspondingly named worksheet, and another with that name but ended by “_working”. For example, the first module originally listed in **module_codes** is MA1CAL, and there are corresponding worksheets **MA1CAL** and **MA1CAL_working**. To make a pair of worksheets for a new module code, copy worksheet **MA1CAL** to a new sheet, rename it with the new module code, and paste in student numbers, surnames plus initial, and forenames of students taking this module. Copy worksheet **MA1CAL_working** to a new sheet, and rename it with the new module code followed by “_working”. No need to paste student details into this sheet –it will update itself.
5. Similarly, each tutor listed in **tutor_codes** needs a correspondingly named worksheet. To make a new worksheet for a new tutor, copy worksheet **AYREK1** (say) into a new worksheet, and rename it with the new tutor code. Note that it’s assumed that each tutor will have no more than 10 tutees.

Day-to-day running

1. Enter problem sheet marks (plus optional tutorial attendance (Y/N for example)) into the module sheet for the relevant student and week, e.g. **MA1CAL** say.
2. Students who are possibly at risk will have a warning flag raised in column AR of the relevant module sheet – this will be highlighted in yellow with the problem weeks bookended by ## (this text triggers the conditional formatting). Flags are only raised if **both** the p-chart and the individual moving range lower confidence bounds (LCB) are exceeded (this was indicated in Ayres, Biggs & Glaister, 2012, as being an appropriate strategy).
3. Either these sheets can be viewed by the Senior Tutor or, more likely, output files and emails are desired for sending to tutors – the next section covers how these are achieved.

Producing output

All of this comes from the catchily-titled worksheet **run_things**, which is the main worksheet ...



Note again that the individual worksheets will update themselves as new marks are entered. The steps below are only needed to produce charts and emails ...

1. Charts are saved as .pdf files for email purposes in a directory called “/PDFs” within the current directory. The top button will make this directory for you if required.
2. Click on the button “make all charts” to, surprisingly, make all the charts, both the charts-by-module and the charts-by-tutee, looping over all the tutors listed in worksheet **tutor_codes**.
3. Click on the button “print charts-by-module to PDFs” to save all module charts as .pdf files within the directory /PDFs, again looping over all the tutors listed in worksheet **tutor_codes**, one .pdf file per tutor.
4. Click on the button “print charts-by-tutee to PDFs” to save all tutee charts as .pdf files within the directory /PDFs, again looping over all the tutors listed in worksheet **tutor_codes**, one .pdf file per tutee per tutor.
5. Then you have four email options:
 - a. “send emails (no attachments)” loops through and writes emails (using Outlook) to all tutors containing just a text summary of their tutees’ marks, with flagged marks (if both P-chart and Individual Moving Chart both suggest a problem) bookended by “##”s. Emails are displayed for checking.
 - b. “send emails (charts-by-module attached)” does as a., but for each tutor email also attaches their tutees’ summary module chart for the current week.
 - c. “send emails (charts-by-tutee attached)” does as a., but for each tutor email also attaches all of their tutees’ summary charts for the current week.
 - d. “send summary email to Senior Tutor” simply sends an email to the email address given on the parameters worksheet, containing a text summary of marks of all students who have a possible problem flagged.

As a final note, to ensure that the screen does not become a rush of sheets switching between each other, clicking each button will usually minimise the workbook window, and invoke a simple UserForm that just informs the user that the program is running.

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