8 Harnessing "WebWork" Platform To Engage Students

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Summary of Teaching & Learning Context

In the academic year 2021/22 I have scaled up use of the "WebWork" platform for my mathematics courses. WebWork is an online platform allowing students to try mathematics problems. The system is popular since it allows the instructor to control most details, such as how many times a student can try a problem, how many marks per problem, etc.

Full details on this open source platform can be found at: http://www.webwork.maa.org/getwebwork.html

This active learning method was targeted at a group of approximately sixty students in their third year of engineering courses. I also used the system for smaller apprenticeship courses. It should be noted that the system can scale to many hundreds if needed.

For the academic year 2021/22, I have also used the data collected by the WebWork server to compile usage statistics that I am in the process of preparing for a case study publication on students' device-usage habits: does choice of web browser influence student scores? This is joint work with Dr F. Hegarty – MSP/Berkeley , CA, USA.

Implementing the Strategy

I had experienced this learning platform in previous employments at NUIG and UL, and also from speaking to colleagues from international institutes. Moreover, this is an internationally recognized piece of software in mathematics. The WebWork platform allows for students to attempt mathematical problems that are individualized and taken from a pool of well-known texts in the area of study. The software is free and open source, easy to use and displays well on both large and small screens.

The WebWork system is currently a key part of the students CA grade, with instantaneous feedback and transparency for the student.

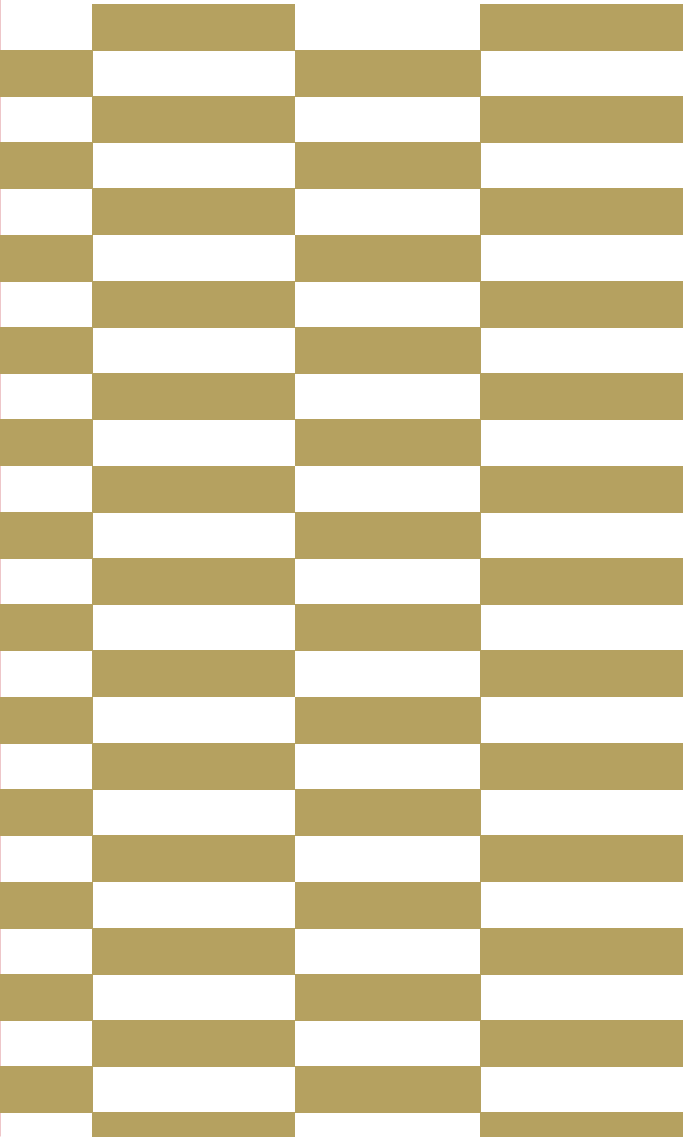
I wish to thank the IT helpdesk for helping me implement this software. I contacted them, and within hours I had full control of a virtual machine running WebWork. From there I populated the software with student lists, and added questions for CAs along with deadlines. The addition of questions is akin to shopping, you simply open the library and pick and choose the questions you want.

Your Observations/Reflections

I would advise newcomers to set the software up and play with it a few weeks prior to get the feel for the potential issues, such as certain questions using feet and not metres and alter a students grade if and when issues arise.

I conducted a simple Google poll asking for feedback, the vast majority enjoyed the experience of being able to try a question many times, and instantly knowing if their attempt was correct or not. Also they enjoyed seeing how the software handled symbolic algebra, by seeing two different forms of the same answer being graded correct.

For the data collection part of my strategy, familiarity with the "Linux" terminal was needed in order to extract access logs from the server itself.



Attached images caption:

A sample question on a Linear Algebra problem sheet asking the student to visualise an algebraic problem. Secondly some preliminary data on student grades and usage habits – this data set is not yet complete.

CA5: Problem 18

Previous Problem | Problem List | Next Problem

This set is **visible to students**

(1 point) **Library/Hope/Multi/02-02-Linear-systems/Geometry_01/Geometry_01.pg**
Match each system of linear equations with the graph that most closely matches it.
Click on a graph to make it larger.

? v 1. $\begin{cases} x = 0 \\ z = 1 \\ z = -1 \end{cases}$

? v 2. $\begin{cases} z = 0 \\ y = 0 \\ x + y = 0 \end{cases}$

? v 3. $\begin{cases} z = 1 \\ 3z = 3 \\ -1/z = -1 \end{cases}$

? v 4. $\begin{cases} x = 0 \\ x - z = 0 \\ z = 0 \end{cases}$

? v 5. $\begin{cases} -x + z = 1 \\ x + z = 1 \\ z = -1 \end{cases}$